

FEATURE ARTICLES

How Leaders Shape Innovation: A Seemingly Paradoxical Yet Necessary Endeavor

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During Operation Allied Force, the B-2 Spirit or “stealth bomber” was tasked with less than 1% of the total missions. Despite such limited use, however, the B-2 accounted for more than a third of the targets destroyed in the first two months of the conflict. To date, no B-2 has been lost in combat and the aircraft remains an effective tool in the arsenal of the United States military. The success of the B-2 can be attributed to a range of factors including its unique capabilities as a long range and extended duration aircraft in that there are no other aircraft like it in operation. In addition, the B-2 is notable in its novelty around defensive and elusive capabilities, which has allowed it to remain largely, if not entirely, undetected by the enemy. Such novel components include innovations ranging from radar-absorbing materials, radar reflective curved surfaces, and heat absorbing tiles that reduce detection of engine heat. To see the plane, if one is fortunate enough to do so given its moniker and rarity, is to recognize how wholly unique it is as an aircraft.

Creative thinking and novel design are hardly the purview, however, of the U.S. or its allies (Grissom, 2006). Thucydides (Thucydides, ca. 460 B.C.E./1972) illustrates the profound impact of innovation in conflict via the “proto flamethrower” used by the Boetians in the Peloponnesian War around 420 BC. In WWII, the German designed and manufactured “Tiger” tank was also uniquely feared as a tool of war. Such fear, it seems, was not unwarranted. A review by Willbeck (2004) revealed that Tiger tanks killed an impressive 11.52 tanks for every one lost in battle. Reasons for the success of the Tiger tank range from novel, extensive, and detailed engineering to heavy application of armor plating that other rival tanks were not able to replicate to, perhaps more importantly, being the first to effectively utilize radios. Such a novel communication approach permitted coordination among units in ways that adversaries lacked. German forces were similarly innovative in their tactics and strategy, showcasing creative thought beyond design and engineering in the use of the blitzkrieg attack (Grissom, 2006). In the more modern era, novel thinking remains central to enemy capacity and capability. Use of hobbyist drones by terrorist organizations and application of cyberwarfare tactics to influence key elections represent modern approaches by the enemy that are threatening, in no small part, due to the originality that characterizes them. Although other examples exist, the above illustrations should suffice to highlight a key takeaway central to our understanding of leading in the military, homeland security, and beyond: innovation is central to military effectiveness.

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Defining Creativity and Innovation as a Process

Most of us have our own implicit definition of what *creativity* represents, yet it is useful to establish a working definition as a common framework for our discussion here. Creativity is defined as the generation of ideas that are both novel and useful or serve some purpose (Amabile, 1988). Thus, novel ideas that do not help solve a problem may be fun, wacky, or interesting but are not creative by this definition. Conversely, ideas that clearly solve a problem in a traditional way are certainly valued as solutions but are also not deemed creative by this definition. Rather, such ideas are more simply defined as effective solutions to a problem.

Innovation, in contrast to the generative nature of creativity, is defined as the implementation of creative ideas (West, 2002). Apparent with these definitions is that creativity and innovation are best represented as a series of processes that interconnect and flow between one another. As such, when discussing leadership for creativity and innovation, it is most accurate to think of success as resulting from performing well across a series of processes rather than being successful at a single task or stage of innovation. Put more directly, leading for innovation is not simply doing well at a generative, brainstorming session but rather influencing how problems are viewed and framed, how solutions are generated, and how they are evaluated and ultimately implemented.

Why Supporting Innovative Efforts is Critical

If we accept the broad premise that innovation is a key component to long-term success across a range of organizational entities, it is useful to outline more specifically why supporting and ultimately, leading for innovation is so critical. Research offers two primary reasons innovation is essential to military thinking and beyond: gaining a competitive edge and building increased capacity to solve emerging problems in an agile way.

Competitive Edge. The first core reason, alluded to via the illustrations offered at the outset of our discussion, is that innovation is central to gaining a competitive edge (Cropley & Cropley, 2008). This competitive edge, however, can manifest in two related but somewhat unique ways. The first is through the pursuit of a common goal, whereby the first to achieve that goal gains an advantage over those who either do not achieve that goal or do so later than their competitor. In relatively recent history, perhaps the most direct illustration of this is the competition between the Soviet Union and United States in their pursuit of space superiority. Although on the surface, it may seem that putting a person on the moon was primarily a noble scientific and perhaps somewhat abstract goal; an underlying tension was between two nations and, ultimately, two forms of governing and ideological foci. The Soviet Union represented an efficient approach to innovation via communism,

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while the U.S. was more rebellious and dynamic in its approach via the application of democratic ideals. As would be surmised given such tension, when Russia successfully launched Sputnik, the first Earth orbiting satellite in 1957, there was a legitimate fear that a democratic model of governing would be viewed by the world as inferior. Visionary leadership via President John F. Kennedy, as well as expertise garnered from unsung female scientists (Holt, 2016) and talented - albeit controversial - German scientists fleeing Europe, ultimately led to the U.S. putting Buzz Aldrin on the moon well ahead of schedule and Russian competitors.

In contrast to the form of competition that aims to claim territory first (physical or mental), the second form of a competitive edge is more direct, where tools and tactics are utilized against an enemy. The aforementioned conflict between German Tiger tanks, European Allies, and U.S. made Sherman tanks is an illustration, as is the continued escalating competition between body armor and emerging forms of ballistic technology. Additional modern illustrations are available via competition in the form of security and detection, and extremist organizations' attempts to thwart them. Look no further than Ibrahim Al-Asiri's attempts to thwart body scanners via the use of embedded explosive devices under the skin. In this

more direct form of competition, novel approaches give a clear tactical edge over one's adversary.

Problem Solving Capacity and Agility. Leaders who build organizations and units that are capable of innovating and gaining a competitive advantage over those less innovative have at their disposal a critical secondary ability: problem solving. That is, organizational entities adept at generating novel

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solutions and innovating have in place the policies, tools, and norms to solve emergent, everyday problems more effectively than those that are more rigid and less innovative. For example, Ford Motor Company, the company that instantiated the Detroit muscle car movement, was able to shift production during WWII to produce B-24 Liberator bombers. Likewise, Amazon in its early days simply sold books via the internet but as opportunities arose, shifted to the purchasing and shipping giant that it is today. Innovative

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organizations can shift and pivot in ways that those that are less innovative cannot. The implication here is that by developing an organization with innovative capacity, that organization secondarily becomes more capable at dealing with emerging and unanticipated problems. In fact, for highly innovative organizations, these unanticipated problems cease being problems and are instead viewed as opportunities. Taken together, innovation enables military organizations to be more powerfully proactive (i.e., staying ahead of their competitors and opponents), while secondarily granting them the capacity to react to new challenges in flexible and efficient ways.

Why is Leading for Innovation Challenging?

If innovation is important, why then does innovation top the list of so many leaders as a difficult endeavor to pursue? Across surveys by consulting firms and organizations such as Development Dimensions International (DDI), PricewaterhouseCoopers (PwC) and IBM, innovation was listed as one of, if not the, top sought-after outcomes; yet innovation was simultaneously also noted as a core weakness across hundreds of organizations (Hunter et al., 2013). This theme has been a consistent one in the academic literature as well – organizations seek innovative solutions but are unsure how to effectively accomplish that end (Mumford & Hunter, 2005). In fact, such a sentiment has given rise to the notion of an innovation paradox, where the pursuit of innovation is not only viewed as challenging but often at odds with traditional forms of organizational functioning (Bledow et al., 2009). In the military context specifically, Rosen (1991) reviewed 20 key innovations and depicted innovation as a type of ideological struggle, requiring a challenging alignment among forces seeking varying and often conflicting goals.

These challenges, tensions, or paradoxes were described in detail as they related to leading innovation processes (Hunter et al., 2011). Specifically, we outlined

14 different paradoxes leaders face in the pursuit of innovation and how to overcome them. Amongst those paradoxes, however, three stand out as most useful in highlighting the challenges leaders must overcome if innovation is a primary goal. In what is referred to as the *failure/success paradox*, for example, leaders face a tension developing “an organizational culture that embraces risk and failure yet is able to produce successful outcomes” (Hunter et al, 2011, pp. 55). Such tension is readily apparent in high stakes scenarios where taking a risk can result in destruction and potential loss of life. In such circumstances, however, failing to generate novel solutions to problems and operating in a stagnant manner can be equally as dangerous.

As a second illustration of an innovation challenge, the *champion/evaluator* paradox is defined as the tension occurring when leaders must be critical as they evaluate ideas and decide which to pursue, and then pivot to serve as a champion for the chosen idea to upper-level leadership and external stakeholders. This is a type of internal paradox that produces dissonance within the individual and can be challenging to perceive oneself as authentic given such conflicting behaviors. The third tension, known as the *vision/autonomy paradox*, occurs when a leader must “provide a vision and direction to team members but also allow for high levels of autonomy” (Hunter et al, 2011, pp. 55). In many military contexts, giving and receiving orders is central to expediency and, ultimately, successful operations. In situations requiring novel ideas, however, autonomy is a critical part of the process and can be at odds with the culture and norms of a typical command and control context.

Although other examples exist (Miron-Spektor et al., 2017), these three paradoxes serve to highlight a central theme in the leading for innovation literature: Leading for innovation is difficult and if not addressed specifically and directly, innovation will not occur. Stated differently, organizations that pursue a business-as-usual approach will not find

success in innovative endeavors. Instead, leaders must be proactive in developing their approach to innovation. In the next section, we outline how leaders can do just that.

How Leaders Shape Innovation: Indirect and Direct Influences

Building to this section, we offered that innovation is a worthy if not necessary endeavor and that success in such an endeavor does not come readily. As a final chapter in our discussion, we turn now to how leaders impact innovation with the aim of offering guidance on how to succeed as innovative leaders. To do so, we turn to an indirect and direct model of leading innovation (Hunter & Cushenbery, 2011; see also Hunter, Cushenbery, & Jayne, 2017). In this framework, leaders are depicted as not only shepherds of creative ideas from subordinates, but also as a part of the innovation process whereby they too contribute to the creative ecosystem. An apt metaphor for this indirect and direct model of leading for innovation is a movie director tasked to develop an innovative film project. The director indirectly impacts innovation in multiple ways, including the staff hired, the actors chosen for the film's roles, and the sets constructed. The director, however, also impacts innovation more directly by the scenes they edit and retain, the words they direct others to say and, at times, the performance they offer if they choose to step in front of the camera themselves. Likewise, military leaders also play a hand in forming ideas, selecting ideas, and making personnel promotion decisions that shape the innovative climates and cultures of their organization. The indirect and direct framework captures the complexity of leading for innovation in that leaders should not only be depicted as drivers who solicit and encourage others to generate novel solutions, but also as participants in generating solutions and play a central role in choosing the path once novel options are developed.

Indirect Influences. Leaders shape innovation indirectly in four primary but related ways. First, they role model behaviors that showcase what is acceptable and unacceptable in their unit or organization. Leaders who ask others to take risks and offer unique ideas but who do not do so themselves will limit their ability to generate truly novel solutions. Instead, leaders must serve as role models for creative thinking and unconventional behavior. As is the case in other contexts, leaders are respected for their ability to “lead from the front” (Johnson, 2015) and the phenomenon of innovation is not unique in this regard.

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Second, leaders set the tone for creative thinking by the rewards and recognition they provide. Because creative ideas often fail, leaders should reward attempts to introduce and share out-of-the-box ideas regardless of their likelihood of success. In contrast, leaders who only reward successes will indirectly send the message that only ideas that clearly produce predictable outcomes are valued. The unique demands of innovation require an openness to a range of ideas, many of which seem odd or strange on the surface initially. Tools that are commonplace in the arsenal of the modern military such as the Tomahawk missile and Predator Drone (Grissom, 2006; Lee, 2019), for example, were once viewed with severe skepticism and resistance. Leadership was essential in transitioning from resistance to utilization.

The third way leaders indirectly shape innovation is through the teams they form (Thayer et al., 2018). Leaders cannot simply place a group of homogenous thinkers together and naïvely hope for a novel

breakthrough (Miller, 2021). Instead, leaders must bring together diverse ideas, which often means engaging with differing perspectives and those with diverse backgrounds. As leaders, they must then actively manage such differences in perspectives to allow for the communication and exchange that permits novel ideas to emerge.

This brings us to the fourth indirect way that leaders shape innovation: through the climate they help establish. Climate represents people's perception about which set of behaviors are valued in a given team or organization. Climate is established in many ways, including the behaviors a leader engages in, the rewards given, and the people recognized as having a voice. The most common form of climate linked to creativity, however, is psychological safety (Edmondson, 1999). Psychological safety means that individuals feel comfortable offering ideas that might be perceived as weird, wacky, or strange. How a leader responds to such ideas will fundamentally set the tone, and by proxy the climate, for a given unit, team, or organizational entity (Carmeli et al., 2010).

Direct Influences. If indirect influences represent the “stage” set by a leader, direct influences are the specific direction offered from a leader. Recall earlier that an accurate representation of leading for innovation requires that leaders be recognized as part of the innovation ecosystem. As leaders, experience, wisdom, and knowledge are all essential ingredients for solving complex problems, and ignoring what leaders can contribute to innovation removes a crucial tool from an organization's problem-solving tool kit. Thus, leaders must be accurately depicted as not only decision makers and shepherds but also as idea generators themselves. Thus, the first direct way that leaders impact innovation is by offering their own ideas and solutions to solving problems. How leaders offer ideas, moreover, flows back to indirect influences as well. A leader who provides a novel and perhaps unconventional idea implicitly

sends the message that such ideas are reasonable and acceptable in that unit or team. In innovation, as in leading more broadly, leaders have to get their hands dirty alongside those doing the work.

The second way in which leaders directly shape innovation is through the strategy and vision they establish. Leadership is, at its core, a process of guiding and aligning others toward a goal. Leaders who set a vision or mission that has, as its primary outcome, creativity and innovation will be more likely to see novel ideas generated and instantiated. Put more simply, if a leader desires creative solutions, they must set a vision that requires and values them as part of that vision. As an illustration, Engel (1994) describes the development of the Tomahawk cruise missile as a result of a vision surrounding the establishment of a team that comprised both senior and mid-level officers. This coalition in the vision that defined the team was critical to overcoming barriers to the innovative tool that became a mainstay of the U.S. Navy (Grissom, 2006).

The third way leaders directly shape innovation is through resource allocation. If novel ideas receive few or no resources, innovation is unlikely to flourish. On the surface such advice may seem obvious, yet it is critical to bear in mind that novel ideas face significant bias. The more novel an idea, the more likely that idea is to be rejected. Framed differently, there is a natural tendency to prefer ideas that are “tried and true” rather than those that are untested. As such, these ideas tend to receive greater support and, by proxy, resources. If, however, a goal is to generate creative ideas and implement them, leaders must directly and explicitly focus on supporting ideas that are unique and may not present a clear and obvious return on investment. Leaders are in a unique position to be able to direct and guide original solutions from initial resistance to fully fledged breakthroughs.

The fourth and final way leaders directly shape innovation is through the decisions made surrounding novel ideas (Mueller et al., 2018). Consider as an illustration the head football coach who is facing a difficult defense on the opposing side. That coach can choose a more traditional approach or perhaps a new wrinkle or novel “trick play”. As other examples, the CEO of a toy company chooses the lineup for the holiday season and the movie director chooses the scene edits or addition of an unconventional musical score. In a military context, leaders must decide if more conventional operations are the best approach or if an unconventional method would yield superior results. Lee (2019), for instance, discusses the thinking around the use and adoption of Predator Drones. Strongly resisted initially for a host of reasons, U.S. Air Force (USAF) General Ronald Fogleman ultimately made the case for the unconventional application and utilization of the Predator that became a core tool for the USAF. Such examples illustrate that not only do leaders shape the ideas that receive resource support, but also serve as gatekeepers to those ideas moving further in the innovation process. Leaders serve as key driving forces in soliciting original thinking, curating those ideas, and ultimately deciding if such ideas make their way into implementation.

Sustained Innovative Success

To state the obvious albeit with implications that may be less obvious, innovation is easier in an organization when innovation has been previously successful. As a result, organizations that have historically limited their approach to innovation find it more difficult to develop a culture of innovation than those who have been built on, and found success via, an innovative approach or strategy. Therein lies a critical challenge for leaders seeking to develop and encourage innovation: building a long-term approach to innovating. Fortunately, there are four practical ways emerging from science and practice to guide sustained innovation.

The first lesson is taken from success at companies like Lockheed Martin in their Skunk Works model, which resulted in the development of aircraft such as the P-80 Shooting Star, the U-2 spy plane, and the SR-71 Blackbird. Other organizations have followed similar models to develop such advancements as the Motorola Razr, which revolutionized the cell phone market. Even organizations well known for innovation such as Google, have a branch or site dedicated to “moonshot” ideas. In Google’s case, the Google X branch is home to its innovation research agenda. The approach utilized by these organizations, and many others, is to create a space for innovation away from the prying eyes of those that might dismiss more radical solutions before they have had a chance to develop and refine said ideas. The lesson is not to build a multimillion-dollar off-site and high-tech space, although that certainly helps; rather, the lesson is to create a location where individuals are free to express, test, and refine novel solutions without critical judgement. This can be as simple as an office dedicated to creative thinking where the understanding is, “in this space, all ideas are respected and considered”. By carving out such a space, individuals can begin to build norms around developing, sharing, and improving creative ideas (Kallio et al., 2015). Once established in a small scale, these norms can be expanded on a larger scale in the organization.

Along related lines, a second lesson comes from organizations such as Lockheed Martin, which carefully and selectively develops established branches or units recognized as being innovative leaders. Such organizations will then purposefully bring in other individuals to that unit as a means to introduce them to what the creative process looks like, with the hope of training that individual to take those lessons back to their home unit. Individuals remain in the organization for a finite time, work on creative projects, and learn approaches and tactics for innovating. Such a model is an extension of the Skunk Works approach in that it

also emphasizes an established creative “home base”, and then leverages the successes to establish a broader culture of innovating.

An implicit assumption throughout the discussion here is that innovation is highly unlikely or simply impossible without leadership aimed directly at supporting novel thinking and idea development. As such, organizations seeking to establish a long-term approach and strategy for innovation must be careful in who they select or task with serving as innovative leaders. Grissom (2006) notes that both Presidents John F. Kennedy and Lyndon B. Johnson struggled with replacing older, more traditional senior leaders and innovation suffered as a result. Thus, in more traditional organizations, fresh thinking often occurs through seeking and hiring leaders who have a proven track record of innovative success. In organizations such as the military, selection may be more difficult and, instead, may be driven by task assignment. In either case, the central premise, and third lesson on sustained innovation holds: building a culture of innovation means showing what innovative success looks like. Early wins can be crucial in establishing that culture, and care must be given to whomever is assigned a “leading for innovation” role within that organization. Drawing from our indirect and direct model earlier, leaders for innovation must be able to think creatively, have the interpersonal skills to elicit novel ideas from others, and have the relevant knowledge to effectively select and implement those ideas. Stated more directly, when building a broader strategy for innovation, organizations must build early wins, and this requires carefully choosing the right leader to develop those wins.

Given the challenges with innovation and the difficulty in managing paradoxes, one final lesson for building a long-term approach to innovation is to consider alternative leadership structures. For instance, Lindsay, Day, and Halpin (2011) proposed

shared leadership as a viable approach to addressing the increasingly complex environment of today’s military. One specific form of shared leadership, co-leadership, has proven to be a highly viable approach to managing innovation (Lindsay et al., 2011). Summarizing, the tension that occurs when attempting to manage creative and innovative processes can be difficult for one leader to shoulder. Instead, distributing the various processes comprising innovation and creativity among multiple leaders can result in a scenario where each are committed to innovation and each can specialize in the tasks for which they are best suited. History is replete with shared leadership structures, including Smith and Wesson, Hewlett and Packard, and Oppenheimer and Groves in the development of the Manhattan project. By sharing leadership responsibilities, co-leaders are better able to manage the paradoxical demands of innovation, foster different aspects of military culture in support of new endeavors, and make critical decisions effectively through collective dialogue (Bergman et al., 2012).

Summary and Concluding Comments

Many organizations and organizational entities seek innovation, yet most fail in achieving that end; and those that do find themselves performing well, find it frustratingly challenging to sustain that performance. Finding short and long-term success in innovation occurs due to doing several things well and nearly all tracks back to leadership who understands the unique demands of innovation, and focuses efforts on the effective management of the processes comprising the phenomenon. Put differently, innovation does not occur spontaneously, nor does it occur without dedicated leadership.

In this paper, we introduced several of the unique challenges comprising innovation, and in response offered a framework for thinking about how a leader shapes innovative success. Within this framework are behaviors that leaders can, and often must, engage in to

tackle the demands of innovation. As competitors and enemies seek to gain an edge they will undoubtedly turn to novel approaches and tactics. If we are to succeed, we too must embrace a more complete understanding of the innovation process and enable, train, and support leaders who are tasked to finding novel solutions to growing and shifting threats. Failure in this realm, even if challenging, is simply not an option.

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