Strategy

Innovating in New Operating Domains Begins Not in the Pragmatic and Known, but the Fantastic and Weird

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Innovative acts are cognitive leaps in conceptualising fantastic and weird ideas so that opportunities are made available via novel and previously unimagined or ignored ways. Acts of innovation change the system. A successful experimentation involving novelty creates systemic transformation where competitors now must operate in the emergent system that the innovation ushered into reality. In this second paper in a four-part series, we discuss innovation through the lens of military forces and war paradigms to understand how militaries are mostly inhibitive of innovation, especially in new warfighting domains. Traditional mechanistic thinking for militaries seems to inhibit innovation in areas of entirely unfamiliar or emerging war contexts that depart from legacy frames. These include cyberspace, cislunar space, artificial intelligence at the general or advanced levels of development, quantum or other exotic technology, and multi-domain conflicts where different belief systems (social paradigms) on war are used by different stakeholders. Generally, convergent thinking is promoted by military organisations at the expense of seriously entertaining transformative and disruptive ideas. We tend to shun innovative risk, preferring a slower and more painful process of adaptation in complex war. New ideas are only useful if they reinforce our current belief system, and reinforce our legacy system of established rituals, doctrines and institutionalised behaviours.

1. Introduction

Militaries call for innovation more now than perhaps in previous generations, if only due to the increasingly complex social reality that modernity now features for conflicts. The call for innovation is due to the many overlapping efforts of disciplines studying how humans create, think and reflect on how they engage with a complex reality. However, many military experts might refute such an assumption, insisting 'war has always been complex'. This is true, if we remain contextually centred on what people within that period knew as social reality. War has always been historically complex, and arguably chaotic in that organised violence remains the most volatile, dynamic, dangerous and destructive context that humans place themselves into. Wars in the antiquities, feudal ages, in western and eastern configurations, into the Napoleonic Era and European, Westphalian state-on-state conflict are all in their own context extraordinarily complex for those leaders attempting to fight and defeat enemies. Yet for most of human history, warfare has oriented around the regulation, standardisation, uniformity and predictive attempts of control, whether in strategic aims or tactical execution of organised violence. We desire prediction, control and some certitude where organised violence results in our goals that must manifest in a shared social reality. Both we and our enemies are necessary collaborators on how conflicts unfold and resolve, and whether an innovative activity succeeds in changing the conditions for who gains advantage over whom.

It is a controversial argument to state that contemporary warfare is well beyond the complexity of earlier terrestrial or otherwise socially or technologically limited conflict. Often, the reason we stipulate war today is consistent with earlier war periods is to reinforce our ontological position that war itself has an enduring, unchanging nature. We in the western, scientifically rational world believe that the modern scientific ordering and natural laws become a 'paradigm shift' that destroys earlier non-scientific natural orderings (Kuhn, 1996). Scientific paradigms progressively replace outdated or irrelevant ones in a strict Kuhnian sense, but Kuhn's definition of scientific paradigms addressed the progress of science, not war. War has scientific aspects, but war is a social phenomenon where the application of *social paradigms* is more representative versus attempts to use Kuhnian scientific ones (Burrell & Morgan, 1979). Social paradigm theory, developed in the 1970s, is the sociological and organisational expansion of earlier Kuhnian theory with the significant difference in how paradigms interact. Kuhn's scientific paradigms replace and destroy inferior ones, while social paradigms are sustained by populations that operate competing and often *incommensurate*

belief systems on social reality, including what war is and how it is waged.[1] When change occurs, we react and think differently not just due to the emergence of novelty and disruption itself, but how our social paradigms shape and channel us to think differently about that change depending on what paradigm one subscribes to.

Today's military forces and political leadership now have the additional context of violent conflict manifesting not just in the earlier terrestrial domains (air, land, sea), with vastly sophisticated technological abilities and effects, but also into previously unreachable or unrealised domains of cyberspace and space. There is no such objective scale for complexity and conflict, as the subjectivity of human existence is far too difficult to associate universal metrics to such a thing. Yet if 'more' is a factor, modern war fighters must deal with the potential of multi-domain warfare across more domains, in faster and more dynamic manifestations than any previous context. War today extends into a digital plane of human existence, where artificial intelligence and cyber existences form entirely new directions for organised violence to mutate.

Our ability to change what we are as carbon-based life forms at a genetic level is an emerging capability no other species has experienced, nor has any species gained the ability to become multi-planetary. These are game-changing, profound developments equivalent to the development of organic life, the sudden cognitive revolution for early humans, or the emergence of the Gutenberg printing press. That war today offers far more non-linear and emergent paths to unfold in a deeper interplay of terrestrial, non-terrestrial, physical and abstract planes of human experience is a mesmerising statement suggesting that complex warfare today might not be limited by historical definitions and beliefs. Potentially, a multi-paradigmatic war frame would examine beyond any natural ordering, to include the interplay of a range of incommensurate war paradigms that may be employed by a host of conflicting stakeholders. We need to be cognitively flexible to realise the established limits of our own paradigm concerning social reality and war, and venture further into other belief systems. In these grey spaces between institutionalised and indoctrinated war frames, we find the fertile ground for innovation.

I have previously explored how and why militaries stifle new ideas and consider the pattern of outright rejection of novelty and punishment of unorthodox thinking in war (Zweibelson, 2023a, 2023c, pp. 74–92, 2024). Here, I will discuss innovation through the lens of military forces and war paradigms to understand how militaries are mostly inhibitive of innovation especially in new and emerging warfighting domains.

2. Innovation in emerging operating domains

In roughly a century, humans unlocked how to reach the skies in powered flight, and then extended that reach to the stars, landing humans on the moon and flinging unmanned systems to beyond the edge of our solar system. We are boldly exploring not just the celestial space our ancestors could only look upwards at, but we have established a virtual domain that is equally as infinite yet entirely of our own human design. Cyberspace is unique in that it must exist through a scaffolding that starts in the physical world where time and space are explicit and tangible. However, the human experience of cyberspace extends our consciousness beyond the limits of our bodies and the physical planes we exist within normally. There is no 'space' in cyberspace, at least not in how humans previously conceptualised the geographical certainty of the time-space continuum that is the real world. Cyberspace in terms of warfare is additionally unique in that in the physical domains (air, land, sea and space) adversaries must operate within the physically defined limits imposed by reality. Cyberspace occupies a strange hybrid status where physical laws establish certain parameters, yet the virtual world rejects other laws found in these tangible domains and permits greater cognitive and social interface with users in ways that require entirely dissimilar methods and theories, to include that of war.[2]

Cyberspace if anything acts as an extension of the abstract plane of human conceptualisation that previously could only function in our imaginations, where we might dream of fantastic, impossible things that break the laws of physics, or otherwise could never occur chemically, biologically or in any possible material form. Cyberspace provides a new plane of human experience that exists atop the physical reality that humans themselves exist within. Cyberspace is also distinct in that it extends into realms where humans intentionally can explore ideas and conduct activi-

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ties that are impossible in the real world yet produce direct effects that extend back into that same reality. We can innovate in extraordinary ways within virtual realities of our own design, including how war itself is understood across a multi-domain conflict where human belief systems and meaning manifest in physical and virtual contexts.

Humans historically have a tight relationship between creation and destruction, and how new ways of thinking and problem-solving often are driven by or are adapted by how our species seeks to resolve conflict. War and the progress of civilisation are deeply intertwined, whether we like it or not. Innovation produced human achievements in unlocking the air domain, and later the space domain, followed quickly by the cyber domain. These advancements present opportunities for the entire species, which included the extension of war into these new areas. Previously, these areas were unreachable, unrealised, or otherwise impossible and irrelevant to military strategists and tactical practitioners.

However, the western fixation on artificially separating theory and practice has also contributed to a discrepancy between innovation and adaptation, in that modern militaries tend to seek pragmatic, evolutionary, predictable change. Our preference for using one social paradigm in western, industrialised society becomes an advantage in some respects, and a straitjacket in other ways (Paparone, 2013, pp. 28–41; Weaver & Gioia, 1994). This confusion over adaptation and innovation breeds a particular contempt in military theorists over how change ought to occur in war paradigms and military organisations. This confusion also leads to a scorn over how innovation requires fantastical, iterative patterns of ideation, experimentation and increased risk so that, as it is unfolding, innovators are improvising and reflecting without clear goals or rigid plans.

3. Innovation versus adaptation

Starting with innovation and adaptation, the terms *are not interchangeable* despite this occurring frequently in military debate, doctrine and practice. Adaptation is when the system is changed either by a competitor or systemically, such as if a lake experienced a landslide that introduced significant different chemical changes into the water. The ecosystem of that lake would then experience various species declining, and others improving, depending on how the changes in the water impacted the flora and fauna. Suppose one species of fish had a genetic latent ability to thrive in water that was more acidic, while a competitor did not. The change in the water would cause one species to flourish and the other to perish, and the predatory species would need to *adapt* to the changes or also perish.

Adaptation is a reactive behaviour when confronted with a systemic change that causes pain or damage. In the 1930s, the economic depression and drought drove farmers in the American and Canadian prairies to use inappropriate land for farming and poor topsoil management. The natural and manmade causes combined and created a devastating effect of severe dust storms that cascaded in scope, destroying the ecology and agriculture. Settlers and farmers adapted to poor economic and weather conditions in their environ-

ment by increasing the deep ploughing of farmland, displacing the natural deep-rooted prairie grasses that had retained soil and moisture during drought and high winds before human settlers arrived. In this example, the settlers experienced a change in their ecosystem and adapted poorly by reinforcing behaviours that caused further acceleration of the very changes that were forcing them to adapt. Adaptation is reactionary, and poor adaptation carries the risk of further damage and destruction, particularly if adaptive behaviours or actions further remove the adaptor from competing in the new, changed system. On the concept of disruption, the western, modern war paradigm associates one opponent being disrupted or confused (and vulnerable) based on the transformative actions of an innovator. The innovator does disrupt an opponent if the act of innovation creates system-wide transformation, as designer and complexity theorist Russell Ackoff explains (Ackoff, 1981).

Ackoff (1981) offered that humans approach reality and their notion of a problem in four specific ways. Problems are within our heads: reality does not have problems, but humans encountering an emerging reality that conflicts with their goals or expectations do. Militaries prefer Ackoff's first example of 'problem-solution' where if reality provides a best option within a simplistic or closed system, we can validate this analytically, develop universal principles and best practices, and pair future problems with our historical and optimised list of known solutions. We also, when encountering complicated systems that reject singular 'best solution' logic, shift to 'problem resolution' where we skilfully determine a 'good enough' option to accomplish goals. Ackoff also offered the familiar 'problem absolution' where we ignore a problem and hope it fades away. His last construct is most valuable here in discussing systemic disruption and innovation versus adaptation. Ackoff stated that designers seek to perform 'problem dissolution', whereby ushering in an innovative activity that dynamically transforms the entire system, what we thought was a problem earlier is 'dissolved' through the arrival of a new system that we have advantages over our opponents in, at least initially. Opponents must adapt, while experiencing the effects of being disrupted or damaged in this system transformation, and the new system almost always is more dynamic than the previous one. Both the innovator and the adaptor must deal with a new system and engage with new, emergent properties and conditions that offer novel, unanticipated opportunities, and risks (Zweibelson, 2023b). Here, when the innovator is successful, all other stakeholders become vulnerable adaptors, experiencing disruption until they realise the new system conditions and respond productively.

Transformative, disruptive ideas are a double-edged sword in military contexts. The innovator is at great risk when choosing to shift away from 'problem-solution' or 'problem-resolution' to 'problem-dissolution' in that when one follows institutionally sanctioned modes of behaviour, if this results in failure, the actor can defend themselves by stating 'the enemy gets a vote'. Essentially, when we follow the rules set by our organisations on how to go about engaging in organised violence and conflict, whether

through doctrine, best practices, military education and/ or institutionalised norms, failure is rationalised either as gross error by the user or the broader acknowledgement that no process is foolproof for application in all dynamic contexts. Our institution either fires or retrains the operator if it is assumed the failure was unique and specific to some decision-making defect, or the organisation attempts once more while still adherent to all existing practices and doctrinally approved methods. This is where problem-solution or problem-resolution (and sometimes, problem-absolution) occurs cyclically, and little to no innovation is possible except activities that otherwise are indistinguishable from accepted and normalised patterns of behaviour. When the operator dares to venture outside the boundaries of the institutionalised paradigm, they can design through experiment and prototype, often experiencing a much higher degree of failure due to how design differs from planning (Zweibelson, 2023c, pp. 12–62) Innovation is far riskier than conforming through institutionalised and thus non-innovative forms of decision-making in war. Innovators face steep odds of discovering something both novel and useful, and the institution is predisposed to rejecting anything innovative due to how emergence prevents anything novel from matching with historical and legacy frameworks on what is useful or not. When innovation does happen, those competitors experiencing the system transformation now must adapt under duress and some form of disruption. Both institutions will move quickly to institutionalise the novel and move designed innovation into established planning processes. This is a perpetual phenomenon in war, yet our institutions are vastly more comfortable with adaptation and assimilation of innovative activities versus the difficult and uncomfortable investment in curating innovative activities.

Innovation could be conceptualised as the logical paradox of adaptation in that innovative actions are implemented to create systemic change, whether wittingly or unwittingly. Unwitting innovation can be found in examples such as how several engineers from the industrial company 3M were asked to create an airplane 'super glue', and in experimentation stumbled upon the recipe for a somewhat sticky, perpetually adhesive glue that could be used to attach paper to objects in an enduring fashion (*History Timeline: Post-It® Notes*, 2023). The management for 3M told the engineers to stop wasting time with the failed glue, but several engineers continued to experiment on their own as they felt the glue somehow was useful in a yet-to-be-imagined way. This eventually led to the Post-it Note®, and 40 years later more than 50 billion Post-it Notes® are pro-

duced each year (Glass & Hume, 2013). The original glue formula was a failure in that it was not the airplane super-glue original goal. Unwittingly, the innovators knew they had an interesting glue, but they did not yet know what purpose it might serve. Spencer Silver, the scientist innovating with the glue, called it 'the solution in search of a problem', (Warner, 2015) and he would not realise what the problem was until Art Fry, another 3M scientist, realised the sticky glue on paper could serve as unmoving bookmarks in his church hymns during choir practice. The innovators went from unwitting to witting, and from the fantastic and unrealised, or unrecognised by top management wanting super glues, to an entirely new product that would unlock billions in new revenue.

Innovation begins not in the known, pragmatic or the orthodox. In other words, military doctrine is the absolute last place to discover anything remotely innovative, as the military activity of rendering new knowledge into set practices and methodologies only occurs well after any innovation disrupts the system and challenges existing doctrine as vulnerable or obsolete. Innovation occurs in the periphery of the institution, oozing through our own cognitive straitjacket through the seams. Certainly, adaptation finds its primary breeding ground in such contexts where an organisation experiences surprise, confusion or pain due to tomorrow not being as yesterday suggested. Innovative acts are cognitive leaps in conceptualising the fantastic so that opportunities are grasped in novel, perhaps unimagined or ignored ways. This is where the term 'eureka moment' occurs, and the innovator refines an ideation in a way that all others do not possess. Innovation changes the system, in that a successful act of innovation creates systemic transformation where those other competitors now must operate in the emergent system that the innovation ushered into reality.

Innovators *cause* systemic change, and those impacted by that change must adapt in a reactive, secondary and often costly fashion. Innovation cannot be predicted, nor can it be programmed into set patterns of behaviour or indoctrinated. Unlike adaptation, where the institution often understands and encourages the changes as they are implemented, innovation is conducted outside the mainstream. Innovation is frequently conducted in such a way that the institutional defenders resist innovation until such time as the innovation is over, and the system is clearly transforming so that ignoring the innovation will only cause further damage and disruption. There are myriad military examples of innovation, from the rise of air power, the development of the tank, the creation of the aircraft carrier, or

the restoration of mounted animals for reconnaissance and special operations in Afghanistan after the September 11, 2001 attacks.[3] In many historical examples (if not all), the institution resisted innovation quite fiercely.

Additionally, one must not associate innovation exclusively with technological superiority, supposedly sophisticated societies, or formalised education and professionalisation in war. James Mrazek argues throughout his publications on military creativity that 'good fighters have not always been the most extensively trained, but rather the most ingenious in intellectual quality' (Mrazek, 1968, p. 141). Mrazek goes on to quote Chinese revolutionary Lin Biao[4] who, in reflecting on the Russian and subsequent Chinese civil wars, observed that amateurs 'never trained at any military school [yet] have eventually defeated professional graduates from military academies' (Mrazek, 1968, p. 141). This pattern extends from Lenin's communist revolution in the early 20th century into the 21st century, with the Taliban in 2021 rapidly claiming Kabul and demonstrating once more that innovation is available to everyone in war to wage effectively, particularly where low-technology or unorthodox militaries defeat highly professionalised, well-resourced ones.[5]

4. The innovation paradox: military forces inhibit innovation

Why do military forces fight innovation despite paradoxically proclaiming that innovation is a priority requirement? Much of this has to do with the modern war paradigm, and how militaries prioritise a pragmatic, incremental, stable process of assimilating new ideas only as long as they do not disrupt or challenge core beliefs and values. An example of this can be found in one of the selected essays in the National Defense University's *Toward a Theory of Spacepower* 2011 publication. Sheldon and Gray (2011) posit:

> A theory of spacepower must also guard against flights of fancy and overactive imaginations that make theory useless as a guide to practice ... Spacepower is not science fiction, and its intellectual guardians, the theorists ... must take care to protect it from the ignorance of some and the worst excesses of others. (pp. 14–15)

The authors go on to argue that military strategy overall is 'nothing if not pragmatic' and that 'strategic theory is a theory for action', (Sheldon & Gray, 2011, p. 15) citing earlier similar pragmatism from renowned strategist Bernard Brodie (Brodie, 1973, p. 452; Sheldon & Gray, 2011, p. 15). Mrazek (1968, pp. 2–5, 7–11) warns of this systemic belief that in war, creativity is ignored and warfare is viewed as an aesthetic exercise dependent upon analytical thinking, established rules and norms, and some institutionalised mindset of 'this is the right and only way to do such things' that chokes out divergent thinking.

Sheldon and Gray are hardly alone in championing this pragmatic, institutionally self-serving form of demanding all novelty and change ought to be objectively tested, proven and integrated into the legacy framework before any real risks are taken in battle. Naval War College Professor Milan Vego, in authoring his extensive time on Joint Operational Warfare, argues that one should:

> avoid making assertions without any proof or on slim empirical evidence, as is so often the case with the proponents of the so-called new theories of war or new ways of warfare. These theories are largely based on new, and in many cases, unproven technologies (Vego, 2009).

Vego goes on to advocate that modern military theories, models and ideas are based upon 3,500 years of history and experience, and thus cannot be dismissed or modified without serious due cause. Yet Vego makes claims that existing war theories are 'well-documented and proven' (Vego, 2009, p. I-3) despite such arguments being grounded not on any scientific frameworks, rather in the ideological and socially constructed stances that Berger and Luckmann (1966) demonstrate as a confusion of the subjective with an illusion of objective concreteness. Berger and Luckmann explain that:

> [S]ocial order is a human product, or, more precisely, an ongoing human production. It is produced by man in the course of his ongoing externalization. Social order is not biologically given or derived from any biological *data* in its empirical manifestations ... Social order is not part of the 'nature of things', and it cannot be derived from the 'laws of nature'. Social order exists *only* as a product of human activity [emphasis in original] (p. 52).

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3 A fair critique of using mounted animals in Operation Enduring Freedom (OEF) is that this is adaptation since pack animals long existed in warfare before the rise of mechanised machines. This is where innovation and adaptation feature unusual overlaps and tensions, depending on the context. If anything, one could offer that for each current generation of warfighters, if something is positioned well outside the institution, it becomes ripe for acts of innovation. Is it fair to suggest that the most powerful, technologically advanced military force in 1999–2001 likely saw little value in training forces to consider pack animal utilisation in difficult mountain terrain for priority operational activities? If so, the emergent requirement in Afghanistan would offer examples of innovation and adaptation, depending on how the special operations community responded to initial challenges or recommendations to use non-standard logistical operations.

4 Mrazek (1968) uses an earlier mistranslation of Lin Biao's name. He spells it 'Lin Piao', which may have been a contemporary translation of Chinese during the 1960s but is now considered incorrect.

5 The French defeat at Dien Bien Phu in 1954 represents one of the most significant examples in modern history where, for the first time, a major European industrialised power was defeated in battle by a feudal, agrarian and poorly trained/equipped Vietnamese communist force.

War is both a tangible, physical manifestation of organised violence waged by our species against one another, but simultaneously a socially constructed process that only humans understand and engage in. Animals do not wage war. Yet most of modern society extend a particular belief system concerning what war is, and how warfare ought to be understood and consequently waged properly. The belief system is entirely socially constructed and granted some objective concreteness that then provides a firm foundation for 'natural laws' and illusions of 'proven, scientific rationalisation' for principles and rules concerning war. Berger and Luckmann (1966) posit:

> An institutional world, then, is experienced as an objective reality. It has a history that antedates the individual's birth and is not accessible to his biographical recollection. It was there before he was born, and will be there after his death (p. 60).

This is where most military theorists and strategists confuse empirical verification of one's socially constructed reality with that of any actual scientific methods. War is dynamic, complex, and emergent in that each activity of organised violence is a 'one time only' non-repeatable event. We simply cannot claim to test or prove anything except some qualitative and largely abstract constructs that are highly contextual and often temporary. What this means for modern militaries is that we must confront the illusion that innovation should be processed so that our contemporary war beliefs are unchallenged because our theories, models and doctrines are objectively proven in some imagined manner.

Thinking creatively and attempting innovation will not necessarily coincide with previously established beliefs, theories, models or historical patterns. Indeed, Mrazek cites creativity researchers Parloff and Handlon that posit 'creativity may require the temporary suspension of logic' (Mrazek, 1968, p. 142). Berger and Luckmann (1966) provide a deeper explanation of this tension in modern military theorists and practitioners assuming that the objective world extends right into their socially constructed beliefs about warfare and war itself. They provide the example of hunting that can be extended into organised violence:

As the institution of hunting is crystallized and persists in time, the same body of knowledge serves as an objective (and, incidentally, empirically verifiable) description of it. A whole segment of the social world is objectified by this knowledge. There will be an objective 'science' of hunting, corresponding to the objective reality of the hunting economy. The point need not be belaboured that here 'empirical verification' and 'science' are not understood in the sense of modern scientific canons, but rather in the sense of knowledge that may be borne out in experience and that can subsequently become systematically organized as a body of knowledge (pp. 66–67).

5. Conclusion

We go about our lives assuming many things are far more objective or concrete than they are, including war. This leads to military theorists demanding that new ideas subscribe to old frameworks or be tested scientifically so that they can then be shuffled into the existing stacks of 'proven' ideas and models. This mentality directly inhibits innovation in war because any creative thinker that dares suggest a new idea without clear evidence, that also must reinforce the larger war paradigm, is rejected. Old thinking retains an automatic 'home court advantage'. Unfamiliar or emerging war contexts that create unanticipated impacts on our socially construct reality, such as cyberspace, cislunar space, artificial intelligence, quantum or other exotic technology. The home court advantage means convergent thinking is promoted by institutional self-relevance at the expense of transformative, disruptive ideas still under development. Essentially, we do not yet understand the space domain or how it may change war as we know it, but any innovative thinking needs to remain wedded to the realist frames currently endorsed by the military institution. This is when one puts the institutional cart ahead of the emerging, ill-defined space warfare horse. The next (third) paper in this four-part series will talk about a shift in military culture that values imagination over adherence to outdated norms to navigate the complexities of modern warfare (Zweibelson, in press).

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