



MCDC Project:
Future Leadership



A Multinational Capability Development Campaign project

Future Leadership

dated December 2020

is promulgated as directed by the
MCDC Executive Steering group and Secretariat



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Foreword

A proliferation of unexpected global events over the last decade has challenged us to make sense of such ‘unthinkable’ episodes and formulate suitable responses. Being complex, ill-defined, improbable to predict and with no definitive formulation with which to answer,¹ these can be considered as wicked problems.² The return to peer-on-peer contest; the challenge of operating in the sub-threshold dimension and hybrid environments; the ongoing threat from violent extremist organisations; and the emergence of artificial intelligence-enabled technologies, all highlight the need for military organisations that can adapt the way they operate and fight at a pace greater than adversaries.

As military leaders, understanding how these events shape our way of thinking is a decisive factor in making that thinking effective. But, as humans, we are hampered by self-deceptive inconsistencies, contradictions and cultural inertia that undermine the ability to rigorously rethink or challenge past leadership practices. As we progress towards the future, elements of our leadership principles of behaviour, culture and organisational structures that once defined excellence may become less relevant or valuable.³ How military organisations prepare and support their leaders for this future operating environment will be fundamental to their ability to gain advantage.

Due to the expected future growth and expansion of complexity, it is likely that no single leader will be able to make sense of all its more significant challenges. Thus, there is an urgent need for all leaders within our military organisations to engage and examine all facets of leadership, across all domains, to ensure future leaders are suitably prepared and supported. This publication aims to describe the leadership implications of a future characterised by volatility, uncertainty, complexity, ambiguity and an influx of artificial intelligence-enabled technologies. The hope is that this will inform and start necessary conversations that trigger innovative ideas and ways in how best to prepare and support our future leadership cohort to succeed.

Preface

Purpose

1. This publication's principal purpose is to make sense of the leadership challenges presented by the future operating environment and adoption of artificial intelligence-enabled technologies. By analysing these challenges, today's leaders within our military organisations should be better placed to start the conversations needed to understand the changes required to suitably prepare and support future leaders. The primary aim of this publication is to inform and stimulate discussion rather than prescribe solutions.

Context

2. The expected volatility, uncertainty, complexity and ambiguity of the future operating environment will trigger unexpected events that will challenge member nations' ability to suitably respond. This will require military leaders who can seamlessly adapt extant ways of operating and fighting with an agility that outpaces adversaries. But, to suitably develop leaders of the future, there is a need for today's leaders to make sense of the leadership challenges this future may bring.

Audience

3. While of particular interest to those units responsible for preparing and supporting military leaders, this publication seeks to inform all leaders within defence to trigger and gain from their knowledge, experience and diversity of thinking.

Structure

4. This Multinational Capability Development Campaign (MCDC) *Future Leadership* publication is divided into four chapters.

- a. **Chapter 1 – Context.** This chapter introduces the emerging characteristics and themes of the future operating environment, considers what is meant by military leadership and considers the philosophy of mission command and its enduring utility for future leaders.
- b. **Chapter 2 – Leading in the future operating environment.** Initially focusing on problem-solving in the complexity of the future operating environment, the first two sections consider how we think and the leadership approaches that can support this. The next section considers how the pressures of operating in a volatile, uncertain, complex and ambiguous operating environment can impact on an individual's professional effectiveness. As the Information Age continues to evolve, military leaders and their teams must be able to adapt, and with an agility greater than an adversary. The final two sections examines what is understood by the terms of adaptability and agility before considering how this may be required when leading sub-threshold activities across a hybrid environment.
- c. **Chapter 3 – The impact of technology.** To operate and fight at advantage, it will be critical for future leaders to suitably understand, embrace and control artificial intelligence-enabled technologies. This chapter discusses possible impacts of such technologies in terms of future leadership and its ability to maintain appropriate control over artificial intelligence-enabled decision-making and autonomous systems.
- d. **Chapter 4 – Changing organisational culture.** With the emerging characteristics of the future operating environment and increasing adoption of artificial intelligence-enabled technologies, adapting current practice may not be enough. The final chapter discusses the need to develop new ways and new mindsets and the intricacies involved in leading such organisational cultural change.

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A directive shall only include (and never more) what a subordinate cannot order by themselves in order to reach a given aim.

”

General von Moltke⁴

Chapter 1

Context

Section 1 – Future operating environment

1.1. **Introduction.** Whether in terms of expanding threats, the utility of emerging technologies or the thresholds and domains our battles will be fought across, the character of conflict is changing. This section introduces the characteristics of the future operating environment, which are then expanded upon later in this publication. It is only through making sense of these characteristics that military leaders of today can develop the required ways to suitably prepare and support our leaders of tomorrow.

1.2. **The character of conflict.** With increased competition from resurgent and developing state powers and non-state actors, and no signs of the threat from violent extremism being resolved, today's world is increasingly unstable and rapidly changing. It is the age of complex and 'wicked problems'.⁵ These wicked problems cannot be solved in the traditional sense but rather need to be navigated using the most advantageous ways. They can be taxing for even the most able of leaders who could find their existing skills growing obsolete.

1.3. **The future operating environment.** The Development, Concepts and Doctrine Centre's (DCDC) Global Strategic Trends⁶ analysis foresees a future strategic context and future operating environment characterised by volatility, uncertainty, complexity and ambiguity all set against a background of pervasive information and change occurring at a pace never witnessed before.ⁱ The following provides greater detail of these characteristics.

- a. **Volatility.** This relates to the nature, speed, volume and magnitude of change that is not in a predictable pattern. This is a phenomenon that is occurring more frequently than in the past.

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i Chosen by the MCDC Future Leadership project team as a representative example for all allied foresight efforts.

b. **Uncertainty.** Uncertainty leads to a lack of predictability. The future operating environment will make it difficult for leaders to use past issues and events as predictors of future outcomes, making forecasting extremely difficult and decision-making challenging.

c. **Complexity.** To describe complexity, it is useful to first consider that which is complicated. The elements of a complicated problem are related in relatively simple ways; one cog turns, causing the next one to turn as well, and so on. While potentially confusing, complicated problems can be broken down into a series of tidy, deterministic and predictable relationships. Complex problems involve too many interrelated factors and too many unknowns to be reduced to rules and processes; they are unpredictable and constantly evolving.⁷

d. **Ambiguity.** This is a lack of clarity about the meaning or causes of an event – the ‘who, what, where, how and why’. The events that are happening are unclear and difficult to ascertain. From a psychological perspective when experiencing ambiguity, a person’s unconscious ‘fight, flight or freeze’ response can be triggered, leading to potentially unpredictable behaviours.⁸

1.4. **Hybrid/sub-threshold.** For future leaders, hybrid activity can be considered to amplify the volatility, uncertainty, complexity and ambiguity characteristics of the future operating environment. With the distinction between war and peace becoming ever more blurred, both state and non-state based adversaries will threaten the stability of the rules-based international order.⁹ To counter such threats, leadership may shift between the military, civilian-led governmental departments or between national allies that will require increasing levels of collaboration and leading through influence. As this becomes the norm, our future leaders will face a greater range of problems and be required to operate at a different operational tempo, whilst leading a much wider diversity of people that will require a broader range of leadership styles.

1.5. **The fog of ‘big data’.** The future operating environment will include a multitude of sources of information and data. These will confront problem-solvers with a volume and variety of data that is sufficient to

make it difficult to distinguish between what is relevant and what is ‘noise’. However, the requirement to harness this data and convert it into a form suitable for decision-making will remain extant.

1.6. **Artificial intelligence-enabled technologies.** So far, decision-making in warfare has been a human endeavour. However, whereas the use of technology has previously focused on augmenting human physical force, it is now increasingly being used to augment cognitive functions. There is a risk that the pace of technological advances, especially through the latest developments in artificial intelligence and machine learning, will eventually overtake the abilities of humans to comprehend, potentially leaving future leaders exposed and at a disadvantage.

1.7. **Adaptable leaders.** Within this operating context, the ability to bring influence to bear on actors and audiences and gain advantage over adversaries will be more complex and competitive, yet will also be ever more central to delivering strategic, operational and tactical military success. The ability for our future leaders to adapt their ways to these changing operating environments, with an agility ahead of adversaries, will be fundamental to their leadership effectiveness.

Section 2 – Considering future military leadership

1.8. **Introduction.** Our military institutions will, and must, remain largely fighting organisations whose activities are directed between a balance of command, leadership and management. While command is a position of authority and responsibility to which military leaders are legally appointed, leadership is not such a given.¹⁰ A leader’s notional authority over their subordinates needs to be earned through projecting the appropriate type of professional competencies and personality. Military leadership cannot be considered just in terms of mission sets, but rather that which encompasses all military activities. This next section specifically considers military leadership and the question of how future circumstances may serve to challenge it.

1.9. **Military leadership.** Within military contexts, leadership has traditionally been considered as an individual instilling a **process** to influence a **group** towards achieving defined **outcomes**. Over time this has led some leaders to adopt the ‘mythology’ of the ‘heroic leader’.ⁱⁱ Such a belief leads to a culture that promotes singular models of leadership rather than one which is a system of many leaders and subordinates.¹¹ When confronted by the complexity of the operating environment, individual leaders can quickly become overwhelmed (whether they acknowledge it or not), so there is need for military organisations to consider leadership with a fresh perspective. While militaries will always need leaders whose actions and intent can be heroic, it is time to dispense with the myth of ‘heroic leaders’.

1.10. **Leadership as a system of leaders.** Organisations will not perform well unless the leadership at every level reaches a suitable level of effectiveness. In responding to the complexity of the future operating environment, military activities will require leadership to be considered through a systems approach as the standard to increase their effectiveness. Such a systems approach considers all leaders and how they interact up, down and across; in hierarchical terms this means that individuals should be considered as concurrently functioning as leaders, followers and peers.¹²

1.11. **Command and leadership.** In response to the expected pressures of the future operating environment, it will be a commander’s leadership qualities that brings people together and maintains unit effectiveness.¹³ While sometimes there is a need for ‘go on’ (command), there should always be aspirations to achieve the objective using ‘come on’ (leadership).¹⁴ It is through leadership skills, that commanders gain the endorsement of those they command.¹⁵

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ii Military history is replete with stories about heroic leaders. Such stories frequently portray an image of the military ‘heroic’ leader as someone who can do it all. However, this mythological image sets a model of leadership that few, if any, can match. Belief in such myths can result in leaders acting in ways they think they ‘should’, rather than what their skills, experience, judgement and their team’s needs guides them to do.

1.12. **Assessing ‘good’ leadership.** What is assessed as ‘good’ military leadership can be generally considered in two senses: good in the sense of being effective in achieving tasks; and good in the moral sense of looking after the team and acting in ethical ways. For the former, it is a reasonable assumption that a good leader is one who achieves the mission. Assessing what constitutes good moral leadership becomes much more subjective. People are complex, what is perceived as morally ‘good’ to one person may not be by the next. The inconsistencies these subjective assessments may raise can lead to an organisational bias to primarily assess a leader in terms of their objective outputs. However, such a primary focus on outcomes (or sometimes just activity) serves to limit understanding and thinking about the moral sense of leadership. With the growing diversity of personnel and operating environments, these moral aspects will become a more critical factor to enable future leaders to achieve their mission.

1.13. **The chess master and the gardener.** In his 2015 book *Team of Teams*, General Stanley McChrystal described approaches to leadership in terms of a leader being a ‘chess master’ or a ‘gardener’.¹⁶ The ‘chess master’ has similarities with the idea of the ‘heroic leader’ – one individual leader moving all the pieces. The ‘gardener’ more reflects the systems approach to leadership, focusing on leaders shaping their organisations or units to develop their subordinate leaders and provide them with the freedoms to take the initiative and make decisions. This ‘gardener’ approach does not result in sharing the accountability in decision-making, but does allow for subordinate leaders to have requisite authority at their own level of responsibility. While this systems approach to leadership will help leaders to navigate the complexity of future operating environments, they will also be more and more supported by technological innovations. However, without a requisite understanding of how these technologies can benefit or undermine leadership, future leaders could be left ill-informed, ill-prepared and at a disadvantage.ⁱⁱⁱ

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iii An example of this is the emergence of the smartphone. Initially accepted only in terms of a multifunctional phone, there was little consideration of both the positive and negative impacts that universal access to readily available 24/7 Internet, information and high-quality video cameras could have on military operations.

1.14. **Centralised versus dispersed leadership.** Technologies that enable real time communication, and those assessed to emerge within the next 15 years, create an environment that can serve to compress the traditional military organisational levels of strategic, operational and tactical to appear virtually as a single function. Supported by the technology, but not necessarily understanding its full impact on leadership, leaders at the strategic and operational levels can now, and do, micromanage subordinate tactical-level leadership.¹⁷ While oversight is a function of leadership, such micromanagement can serve to bypass, confuse and potentially undermine those leaders directly involved in an operation.¹⁸ For the future, a better understanding of the root causes of such leadership behaviours and how future leaders may better interact across multiple domains and levels of authority is required.


Section 3 – Mission command

1.15. **Introduction.** Since its implementation, there has been (even in the German Army) a tendency to reduce 'Auftragstaktik' or mission command to its 'leader-centric' or top-down aspects only. For Industrial Age challenges, wars and leadership styles, this was good enough. However, with the volatility, uncertainty, complexity and ambiguity characteristics of the future operating environment and emerging artificial intelligence-enabled technologies introducing new challenges, this section goes back to the roots of mission command to consider its enduring utility for future leaders.

1.16. **Mission command.** Emerging from the original German 'Auftragstaktik', mission command is a philosophy that gives powers to subordinate leaders to control how best to achieve their commander's intent. The great Prussian generals of the 19th Century called this 'Auftragstaktik' (leading by task) as opposed to 'Führen durch Befehl' (leading by orders). A key factor of mission command is that decisions are made by those **best placed to make them**. This fosters a mission command philosophy of decentralised decision-making as the first choice. It requires a military leadership mindset that decentralises authority whenever possible to those most knowledgeable of a problem. Interconnected to higher command through feedback loops, action

is led by those best attuned to the source of the complexity. Modern complexity theory supports this idea by suggesting that the most effective way of managing highly interrelated and dynamic problems is by such an approach.¹⁹

1.17. **The principles of mission command.** The overarching mission command principles of accessibility, practicality, adaptability and transferability reflect the mindset traits required by future military leaders, as illustrated in Figure 1.1. Its accessibility of ideas brings leaders and their teams together in shared problem-solving. Its practicality provides all levels of leadership a voice in developing best practice. Its adaptive nature guides leaders away from becoming dogmatic in their approaches and to have a willingness to modify their ways. Finally, its transferability enables its use by leaders across a diverse range of non-military, hybrid-based specialisations and levels of responsibility.



Mission command	Assumes war is	Detailed command
<ul style="list-style-type: none"> • Probabilistic • Unpredictable 	Assumes war is	<ul style="list-style-type: none"> • Deterministic • Predictable
<ul style="list-style-type: none"> • Disorder • Uncertainty 	Accepts	<ul style="list-style-type: none"> • Order • Certainty
<ul style="list-style-type: none"> • Decentralisation • Spontaneity • Informality • Loose rein • Self-discipline • Initiative • Cooperation • Acceptable decisions faster • Ability all echelons • Higher tempo 	Tends to lead to	<ul style="list-style-type: none"> • Centralisation • Coercion • Formality • Tight rein • Imposed discipline • Obedience • Compliance • Optimal decisions but later • Ability focused at the top
<ul style="list-style-type: none"> • Implicit • Vertical and horizontal • Interactive 	Communication types used	<ul style="list-style-type: none"> • Explicit • Vertical • Linear
<ul style="list-style-type: none"> • Organic • Ad hoc 	Organisation types fostered	<ul style="list-style-type: none"> • Hierarchic • Bureaucratic
<ul style="list-style-type: none"> • Delegating • Transformational 	Leadership styles encouraged	<ul style="list-style-type: none"> • Directing • Transactional
<ul style="list-style-type: none"> • Art of war • Conduct of operations 	Appropriate to	<ul style="list-style-type: none"> • Probabilistic • Technical/procedural tasks

Figure 1.1 – Leadership mindset of mission command²⁰

1.18. **The tenets of mission command.** The mission command mindset is guided by the tenets of: trust; empowerment; responsiveness; critical thinking; willingness to delegate authority and decision-making; and readiness to take the initiative. All endure as foundational leadership competencies when confronting the volatility, uncertainty, complexity and ambiguity of the future. Such a mindset, illustrated in Figure 1.2, also allows for a systematic team-of-teams approach to leadership that is both consciously and unconsciously driven by the senior leader's intent. The aspiration of mission command for its tenets to be reflected by, and through, all leadership, reflects its enduring relevance for future military leaders.

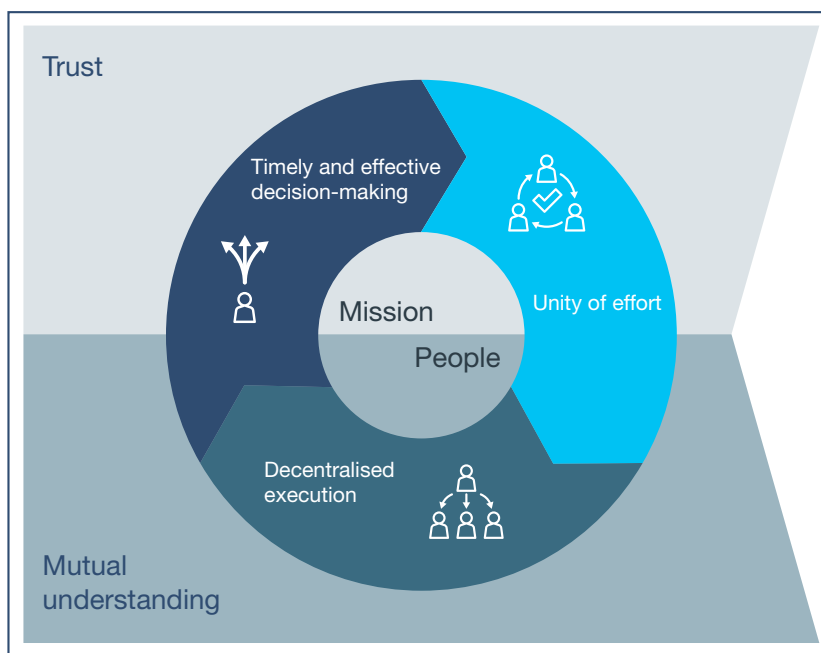


Figure 1.2 – Tenets of mission command²¹

1.19. **Enabling mission command.** For the benefits of mission command to be fully realised by military organisations in the future, it must become a cultural norm, practiced by all. To enable this there are two key considerations. The first is how to provide future leaders with

suitable through-career education and training to instil and maintain the mission command philosophy. The second is how to support all leaders in reflecting the required mindset, requisite trust, knowledge and skills across differing contexts. The criticality of this cannot be overstated as without them, mission command can quickly become just a concept described 'on a page' and not a day-to-day leadership reality.

1.20. **Mission command and future technology.** As the mission command philosophy gives autonomy to subordinate leaders, there are opportunities for this idea to also underpin the use of artificial intelligence-enabled autonomous systems. This is discussed further in Chapter 3.

Notes

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Critical thinking is sceptical without being cynical. It is open-minded without being wishy-washy. It is analytical without being nitpicky. Critical thinking can be decisive without being stubborn, evaluate without being judgemental, and forceful without being opinionated.

”

Peter Facoine²²

Chapter 2

Leading in the future operating environment

Section 1 – Problem-solving in the Information Age

2.1. **Introduction.** While it is not possible to predict the future with any certainty, it is in our ingrained human nature to want to control emerging events by creating structures, tools and visions. We strive for the simple, or at most the complicated, to allow problems and situations to be familiar, approachable and, most importantly, solvable. Complexity is unsettling in its challenging of the status quo by increasingly manifesting itself in ways that question our way of life and the rules by which we live. While embracing complexity is also often the only way to adapt quickly, it is tempting, and indeed comforting, to approach such complexity in the time honoured traditional, Industrial Age way and treat it as though it is complicated. However, if we choose a path that appeals to our human need for cognitive comfort or try to make the environment adapt to us instead of adapting to the environment, we are setting ourselves up to fail.²³ Focusing on the complexity of the future operating environment, this section considers how we think and problem-solve and the potential challenges and pitfalls of this for future leaders.

2.2. **Complex problems.** The Industrial Age is **over**. The Information Age is here, well established and continually evolving. Across societies and around the globe, new cultural, socio-economic and geopolitical constructs are perpetually emerging and coalescing. Today's global context confronting military organisations reflects this increasingly unstable and rapidly changing world. It is the age of complex and 'wicked problems'.²⁴ These complex problems cannot be resolved using traditional military thinking.

2.3. **The Cynefin framework.** The spectrum of problems can be considered as illustrated in the Cynefin^{iv} framework at Figure 2.1.

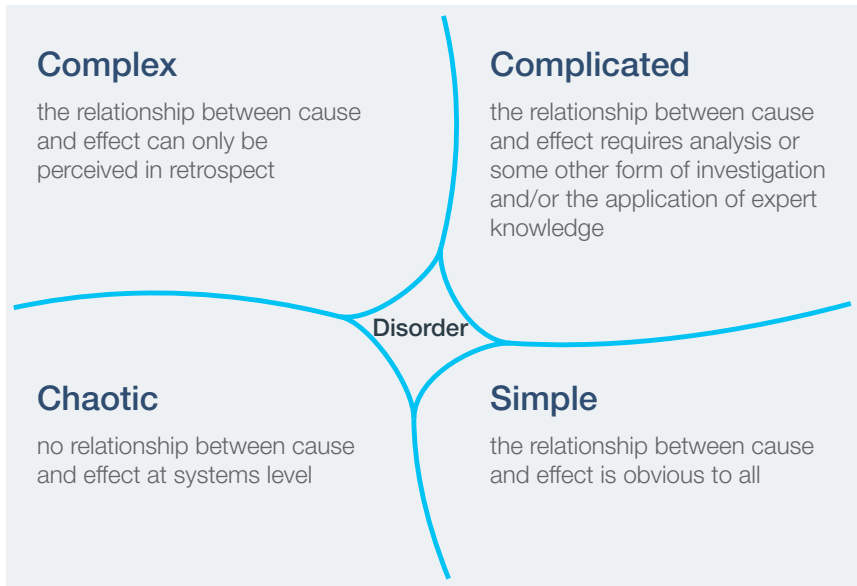


Figure 2.1 – Cynefin framework²⁵

2.4. The Cynefin framework classifies challenges into five contexts defined by the nature of the relationship between cause and effect: **simple, complicated, complex, chaotic** or **disorder**. The first four require problem-solvers to analyse situations and to act in contextually appropriate ways, whereas disorder is applied when it is unclear which of the other four is predominant.²⁶

- a. **Simple.** In a 'simple situation', the relationship between cause and effect is obvious, as are the immediate actions that need to be taken. An example would be a car failing to start because the battery is flat. Within a military context, these are situations in which drills or standard operating procedures are applicable and usually implemented automatically.

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iv Cynefin, is a Welsh word that signifies the multiple factors in our environment and experience that influence us in ways we can never understand.

b. **Complicated.** Within a complicated situation, the relationship between an effect and its cause may not be obvious, but can eventually be broken down into clear, deterministic relationships. An example is the analysis of engine part failure rates to predict replacement part requirements. It may be difficult to do, but complicated problems can be resolved. The deterministic nature of these types of problems offers a level of predictability to plan responses for future, similar occurrences.

c. **Complex.** Complex situations or ‘wicked problems’ occur when the relationships between events may not be obvious. Even with analysis, the problems are open to outside influences, not all of which are known. These situations require a non-linear, critical thinking approach; leaders who try to simplify complexity are likely to fail.²⁷

d. **Chaotic.** A chaotic situation occurs when there appears to be no link between causes and the effects being witnessed. Situations such as the immediate aftermath of a major disaster often appear chaotic, with many (apparently) unrelated effects being observed. In chaotic environments, a leader must first **act** to establish order, sense where stability is present and from where it is absent. As some form of order is established, such problems may become considered in the form of one of the other contexts.²⁸

2.5. **Time.** Although not mentioned in the Cynefin framework, time could be considered as an additional influence on problems, acting to further compound problems. A common example is applying unrealistic timelines that serve to inject complexity into what was a complicated task. Such framing can lead to very different solutions being applied.

2.6. **Thinking as a capability.** ‘Thinking’ is much more than just a conscious mental activity. It is a combination of unconscious, instinctive and learnt processes that are influenced profoundly by the environmental cultures in which it is practiced. As it forms the basis for all activity, the military should consider thinking in terms of a capability rather than simply as an individual trait.²⁹ In doing so, thinking can be considered in terms

of not only the needed ways of thinking but also in the means and the will required to realise it.³⁰

2.7. Thinking and intuition. A crucial factor that credible military leadership depends upon is an ability to think effectively. However, current understanding and management of thinking skills across many military organisations is relatively narrow.³¹ This has resulted in a bias towards conscious, reductionist thinking (associated with complicated problems). An alternative to this type of thinking is in the use of unconscious 'leader's intuition'. Evolved as mental shortcuts, intuitive thinking allows for quick, unconscious decisions based on previous experience that allowed early humans to escape perilous situations. However, as such intuition relies on previous experience, which for most people will be based on reductionist thinking, when confronted by complex problems, it can act to impair judgement and lead to suboptimal solutions.

2.8. Thinking mindsets. The stress of attempting to manage complex situations can cause anxiety to both organisations and leaders alike. This can result in complexity being avoided by a strategy of inventing consistent and predictable views of how things 'should be' rather than as they really are. Whilst this permits leaders to remain in the more 'comfortable' traditional mindset associated with complicated problems, it leads to a significant risk of generating inappropriate answers or misguided strategies and subsequent further disorder. When confronting complexity, our leaders must be capable and willing to adapt their thinking to more suitable ways.³²

2.9. Creative thinking. Sometimes unpredictable and seemingly characterised by periods of apparently unintelligible disorder, people themselves can be considered as complex entities. A strength of this characteristic is that if given suitable freedom and space, creative and innovative thinking can emerge offering unique and novel solutions. However, with many military organisations being culturally more comfortable within the simple and complicated side of the Cynefin framework, such creativity can be perceived as transgressive, subversive or problematic. The result is creative thinking becoming effectively suppressed throughout many military organisations.

2.10. **Cognitive conformity.** As an evolved response to improve the chances of survival, social conformity results in shared values and similar behaviours within a group.³³ From a military perspective this conformism can have positive effects by engendering discipline and control. However, it can also have negative impacts on how its people think. When confronted by complex problems, it can lead to a tendency towards cognitive conformity and group consensus that reflects traditional, linear thinking approaches, rather than more critical thought that can lead to alternative courses of action.³⁴ This can be exacerbated by expectations and pressures to conform to the organisation's perspective to progress professionally. Such conformity acts to diffuse 'thinking' responsibilities to just the senior leadership, thereby engendering a culture of groupthink.³⁵

2.11. **Groupthink.** While in stable conditions groupthink can produce benefits in terms of efficient action, it becomes a major liability when problems are complex and dynamic.³⁶ It inhibits diverse, critical thought resulting in inappropriate decisions for the problems faced. Unless mitigated, such groupthink will continue to inhibit leaders and teams in their ability to adapt their ways of thinking to more critical approaches in response to the future's increasing number of complex, wicked problems.³⁷

How we think



The first kind of human thinking (type 1) is generally unconscious and intuitive using a 'rule of thumb' approach that provides a solution to a difficult problem by simplification. This 'type 1' thinking subconsciously tries to use previous experience to help solve a current problem. This is great for simple and complicated problems.

The second kind (type 2) is conscious thought that entails deliberate and structured processes. This 'type 2' thinking, also known as critical or non-linear thinking, is suitable for complex problems. As an ingrained coping mechanism, people tend to make their decisions using 'type 1' thinking. However, relying on such intuition for complex problems can lead to erroneous judgements and decisions.³⁸

2.12. **Critical thinking.** Studies demonstrate that a fluency in critical thinking techniques notably improves an individual's ability to respond effectively to changing and complex environments.³⁹ However, until military organisations can overcome their current biases towards traditional approaches to thinking, suitably preparing and supporting future leaders to navigate complex problems will be challenging.

2.13. **Big data.** The 1990s revolution in military affairs concept^v claimed that the Information Age's greater accessibility to data would alleviate the uncertainty of Clausewitz's 'fog of war'.⁴⁰ However, the sheer magnitude and availability of such data generated similar uncertainty, but now due to a 'fog of more'. Research undertaken by IBM⁴¹ identified three characteristics of this 'big data' that could impact on leaders' ability to make decisions. These characteristics are: volume and variety; veracity; and velocity.

a. **Volume and variety.** The vast wealth of data available can increase temptation to delay a decision due to the concern that 'we can always know more' resulting in a paralysis in decision-making. Variety of data also adds to the cognitive challenge, as it requires a greater diversity of awareness and understanding of factors that can impinge on the situation.

b. **Veracity.** This refers to the threat of erroneous data, unreliability, imprecision or even deliberate disinformation. In the case of the latter, deception through disinformation will become more refined and subtle with adversaries able to sow ambiguity and uncertainty through a broad range of outlets. In sowing such discord, trust may be undermined, not only detrimentally impacting on decision-making, but also on a leader's ability to build and maintain team cohesion.

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v The United States coalition's swift and impressive military victory in the Gulf War in early 1991 ignited a widespread debate, titled as a revolution in military affairs (RMA), regarding the transformative nature of modern technology in warfare. However, the global challenges of the past 15 years that defence organisations have faced have increasingly called in to question the efficacy of the RMA concept and its application.

- c. **Velocity.** Finally, the velocity at which information travels can compress the available time to consider decisions or simply outpace the decision cycle altogether, forcing errors and leading to an organisation being at a disadvantage.

2.14. **The role of technology.** Even with suitable critical thought, the volume, variety, veracity and velocity of data could soon overwhelm human capacity. In response, both military and civilian enterprises are looking towards the use of artificial intelligence-enabled technologies to support human decision-making. This use of artificial intelligence in decision-making is discussed further in Chapter 3. Having considered the future operating environment's impacts on problem-solving, the next section considers how certain leadership approaches may best support this.

Insights



- Unlike complicated problems, complex problems cannot be reduced into component parts. They are considered wicked problems because they can be ill-defined, have no definitive formulation with which to approach them and have a propensity to evolve over time in unexpected ways.⁴²
- To achieve informed decisions and gain advantage when confronting increasingly complex and wicked problems of the future, military organisations require leaders who can think critically and embrace the cognitive diversity of their teams.⁴³
- Overcoming the current cultural lack of emphasis on critical thinking is an essential step in preparing military organisations for the complexity of the future operating environment.⁴⁴
- There is a need to better understand the impacts of 'big data' on future leaders' problem-solving and decision-making.

Section 2 – Leading in complexity

2.15. **Introduction.** While there are many similarities to civilian leadership, a fundamental distinction that separates military leaders from their civilian counterparts is the routine and legitimised use of lethal and destructive force. A unique part of military leadership is making decisions and initiating actions that place humans into certain mortal danger to deliberately inflict death and destruction upon an adversary. While the concept of emotional intelligence may seem to conflict with this requirement, it becomes significant when leading in complex scenarios of the future operating environment. This next section considers this significance and the possible use and role of emotional intelligence in future leadership

2.16. **The inclusive team.** The ability of military leaders to harness the diversity of experience and thinking within their teams will significantly enhance the likelihood of successfully navigating future complex mission sets.⁴⁵ To enable this, future leaders will need to instil open and receptive working and operating environments. Promoting such environments in which constructive feedback is enabled leads to confident and measured risk taking and contagious enthusiasm. However, the ability for leaders to enact such environments across a diverse range of people is not a naturally occurring trait for all.

2.17. **The influence of personality.** Recent research into personality types offers evidence that by the time an individual has reached adulthood their personality traits are fairly set.⁴⁶ As personality types have both strengths and weaknesses, this can have associated positive and negative impacts on their leadership performance. Successful military leaders can embrace their strengths and mitigate weaknesses by tailoring their leadership approaches to the context of a task or needs of a group. While some leaders possess personality traits that allow them to do this naturally, these are not inherent in all people. However, there exists a concept emerging in general and applied psychology that can provide suitable ways for leaders to learn to suitably tailor their leadership approaches – emotional intelligence.

2.18. **Emotional intelligence.**^{vi} Ongoing experimentation highlights that leaders who possess developed emotional intelligence have a significant beneficial impact on the thinking and problem-solving of their teams and units.⁴⁷ This can act as an important enabler to effectively address otherwise daunting mission sets that demand constant adaptation and innovation.⁴⁸ With such utility in leading diverse teams, it can be considered as an important competency for future leaders to maintain unit effectiveness in response to evolving and complex operating environments. Emotional intelligence does not mean that a leader must be amiable all the time; it can be witnessed in a leader confronting a subordinate with an uncomfortable but significant truth. It does not mean allowing one's emotions to run free but rather managing them to ensure team cohesion.⁴⁹

2.19. **Leadership styles.** Table 2.1 illustrates six distinct leadership styles, each springing from different components of emotional intelligence, with the settings where they could be of use.⁵⁰ In supporting future leaders to develop and utilise such styles, they could more easily adapt how they communicate their leadership to diverse audiences for different scenarios. In doing so, they will be better able to embrace and use the team's diversity of thinking and so develop ways that can navigate complex problems better.

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 vi As still an emerging concept, there remains much ongoing research into emotional intelligence within leadership. With many differing viewpoints, this publication focuses on Daniel Goleman's work into emotional intelligence and its role in future leadership.

	Commanding	Voluntary	Affiliative	Democratic	Pacesetter	Coaching
The leader's modus operandi	Demands immediate compliance	Mobilises people toward a vision	Creates harmony and builds emotional bonds	Forges consensus through participation	Sets high standards for performance	Develops people for the future
The style in a phrase	"Do what I tell you."	"Come with me."	"People come first."	"What do you think?"	"Do as I do, now."	"Try this."
Underlying emotional intelligence competencies	Drive to achieve, initiative, self-control	Self-confidence, empathy, change catalyst	Empathy, building relationships, communication	Collaboration, team leadership, communication	Conscientiousness, drive to achieve, initiative	Developing others, empathy, self-awareness
When the style works best	In a crisis, to kick start a turnaround, or with problem employees	When changes require a new vision, or when a clear direction is needed	To heal rifts in a team or to motivate people during stressful circumstances	To build buy-in or consensus, or to get input from valuable employees	To get quick results from a highly motivated and competent team	To help an employee improve performance or develop long-term strengths
Overall impact on climate	Negative	Most strongly positive	Positive	Positive	Negative	Positive

Table 2.1 – Leadership styles⁵¹

2.21. **Developing emotional intelligence.** While emotional intelligence can be developed through coaching and mentoring,⁵² such development will need to be personalised for each leader. For the large number of leaders within military organisations, further analysis will be required to understand how this could be achieved.

2.22. **The resilient leader.** Even by using a balance of leadership styles, the emerging volatility, uncertainty, complexity and ambiguity of the future operating environment will place additional pressures and stresses on those involved.⁵³ As no organisation can be deemed resilient without resilient leaders the next section considers how the volatility and uncertainty of the future operating environment may serve to undermine a leader's effectiveness.

Insights



- Diverse teams allow for the necessary diversity of thinking required to navigate the complex problems of the future operating environment.
- In leading such diverse teams, potentially across dissimilar organisations, developed emotional intelligence should be considered as a critical competency for future leaders.⁵⁴
- To prepare and support future leaders to apply requisite leadership styles in the right measure and at the right time will not be straightforward and requires further investigation and analysis.

Section 3 – The resilient leader

2.23. **Introduction.** Much has been spoken and written of the need for resilient organisations that can adapt and respond quickly to the warning signs of emerging threats.⁵⁵ But such resilient organisations can only be so by having resilient leaders. With the persistence of global competition placing greater challenges and pressures on military organisations, a key factor of their future resilience will be measured in terms of the mental resilience of their leaders and the people they lead. This section considers how this can impact on an individual's professional effectiveness.

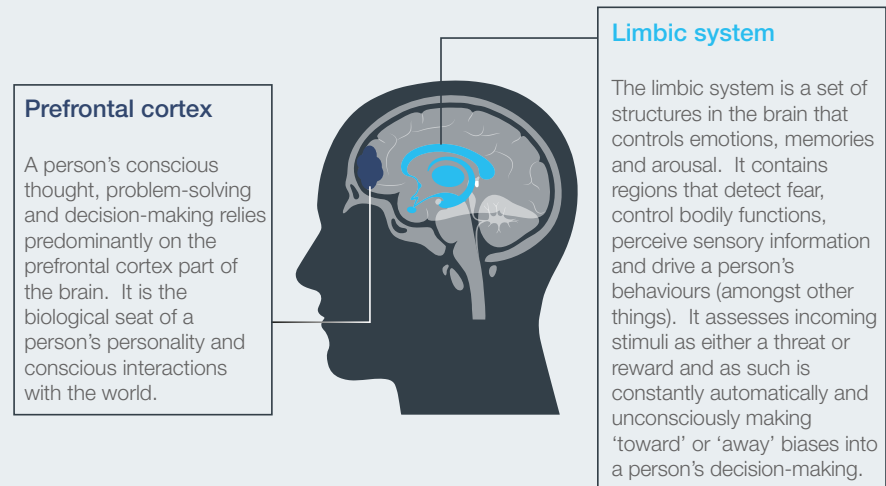
2.24. **Mental resilience.** The future operating environment will expose people to many potential stressors and trauma.⁵⁶ To maintain its operating and fighting effectiveness, military organisations require leaders and personnel who are mentally resilient to such pressures. This resilience can be considered as an ability to psychologically adapt and function during periods of significant or chronic stress. However, while we live in the modern world, this is challenged by evolved 'pre-programmed' unconscious mental triggers from deep within our brains. This can result in physiological responses within an individual that can undermine their operating and fighting effectiveness.

2.25. **The human brain.** Our brains can be considered as a mix of the present and the past. While the brain's prefrontal cortex offers us the ability to reason and interact with the modern world, its limbic system is set in pre-history, predominantly focused on survival. The following vignette provides a brief introduction to some of the ways our brains can be considered as both modern and, concurrently, a 'caveman inside of us'.

The caveman inside of us:
a brief introduction to the brain⁵⁷



The biggest constraint for most people is in the limitations of their brains. With its neural connections making some perceptions and actions feel welcoming whilst others discomforting, it greatly impacts on a person's behaviours. With the advances in neuroscience, neuropsychologists can now observe these neural pathways working real time and better understand the brain's complexity. From a mental resilience viewpoint, there is a need for people to understand their brain in its ability to influence their behaviours both consciously and unconsciously. Generally, the brain's prefrontal cortex provides conscious activity and its limbic system its unconscious outputs. When confronted by volatility, uncertainty, complexity and/or ambiguity, it is in the unconscious responses of the limbic system where an individual's mental resilience can be most unknowingly and surreptitiously undermined.



2.26. **Stress.** Perceived threat or fear unconsciously triggers the limbic system to release stress hormones. The magnitude of hormones released is known as the allostatic load; the higher the loading the greater the chance of physiological responses.^{vii} In threat scenarios, this is commonly known as the 'fight or flight'

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vii For example, heart and breathing quickening and muscles tensing.

(or indeed freeze) response. Evolved in humans as a survival mechanism it allows quick reactions to life-threatening situations. However, the limbic system can also similarly unconsciously react in response to modern factors such as volatility, uncertainty, complexity or ambiguity that are not directly life-threatening. These occurrences where the brain reacts to perceived threat (whether real or not) can, over time, lead to psychological fatigue and the undermining of an individual's mental fitness and subsequent mental resilience.⁵⁸

2.27. **The overwhelmed leader.** Whether due to real or perceived threats, as an individual's allostatic load reaches its limit, the limbic system can place them into a sense of personal crisis. If enough pressure^{viii} is applied, a state can occur in which a person becomes mentally overwhelmed, resulting in their ability to think becoming impeded and therefore less effective. When insufficient knowledge of these impacts and a military 'can-do' attitude combine, warning signs are commonly ignored by individuals resulting in degraded mental fitness, undermined mental resilience and reduced professional effectiveness.

2.28. **Stress and problem-solving.** Uncertainty in problem-solving is a common trigger for the unconscious release of stress hormones. The subsequent rise in allostatic load can trigger a state of anxiety. In responding to this anxiety, the limbic system subconsciously focuses the brain's attention towards what it perceives as the nearest 'threat'. This focusing on the 'closest crocodile to the canoe' rather than considering all elements of a problem can result in oversimplified solutions to complex problems that lead to positions of disadvantage.⁵⁹ While this type of cognitive shortcut is an illustration of how the brain unconsciously attempts to protect itself from overload, its most common method is in forming biases.

2.29. **Bias.** Bias is a prejudice in favour of, or against an idea, person or group compared with another. Although used in everyday language, its impacts are regularly misunderstood and overlooked. When resolving problems, both conscious and unconscious biases act as shortcuts to filter the myriad of possible options. However, when faced with

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viii This can be the result of external pressure to military organisations, internal to them, or those applied internally by an individual themselves.

complex problems, scientific studies have highlighted how bias frequently undermines the criticality of problem-solving and decision-making.⁶⁰ In using these ‘shortcuts’, the analysis and understanding of complex problems were oversimplified or misinterpreted, resulting in inappropriate solutions being implemented.

2.30. **Overconfidence bias and status quo bias.** Two reported common forms of biases that have negatively impacted military institutions (and indeed many civilian organisations) are overconfidence bias⁶¹ and status quo bias.⁶² Overconfidence bias arises when people are confronted by complex problems that consist of many uncertainties and unknowns. As the brain finds it difficult to accept uncertainty it will try, whenever possible, to dismiss or ignore it. The resultant bias leads to an unconscious (or indeed conscious) overestimation of the grasp of a situation and underestimation of the unpredictability of future outcomes. This commonly leads to poor decisions. Status quo bias occurs when there is a need to adapt. The current organisational cultural position (or status quo) is taken as a reference point from which any deviation is perceived as a loss, so inhibiting the ability to adapt.

2.31. **Managing stress.** Already, many elements of military tactical training can be described in terms of stress inoculation training by exposing military personnel to likely stressors they will experience during operations. This type of training succeeds by allowing these tactical-level stressors to be experienced in a controlled environment. As they become more familiar, predictable and better understood, the brain’s response becomes desensitised and more consciously controllable.⁶³ With the characteristics of the future operating environment acting to amplify stress, there is a need for military organisations to seek ways to support the mental fitness of its leaders and the personnel they lead across all professional activities.

2.32. **Mental fitness.** As a proven way to impede mental illness, mental fitness education and training leads to improved mental resilience.⁶⁴ Neuroscientists’ findings of the profound parallels between physical and mental fitness support the idea that specific mental exercises allow the mind to become more ‘fit’ and better protected. However, while physical fitness education is provided widely across military organisations,

education in mental fitness and how the brain and body reacts and responds to stress is not as well developed.

2.33. **Mindfulness.** While not widely practiced in most Western military organisations, mindfulness training can offer understanding and self-awareness of potential stress triggers. Eastern contemplative traditions have long held that cultivating a specific mental mode gives rise to enhanced well-being. With its ability to support an individual in understanding their emotional responses better, interest in mindfulness in the West has grown in recent decades. Research shows how mindfulness training can allow a person to alter their brain processes to more effectively manage their emotions under stress.⁶⁵ With the persistence of global competition and characteristics of the future operating environment expected to place yet further mental pressures on future leaders, mindfulness education and training could become a non-discretionary support requirement.

2.34. **Resilience and organisational culture.** To ensure their future resilience, military organisations must be able to adapt their existing approaches with an agility greater than an adversary. With the meaning of these terms lacking consistency, the next section discusses what is understood by the terms of adaptability and agility and the inherent challenges therein.

Insights



- The expected characteristics of the future operating environment could serve to place additional psychological pressures on military leaders and the people they lead.
- Suitable mental fitness education and training directly supports mental resilience and military unit operating and fighting effectiveness.
- While highly unlikely that bias can be removed, with suitable critical thinking education and training, its negative impacts may be reduced.

Section 4 – Adaptability and agility

2.35. **Introduction.** The emerging future operating environment will challenge our militaries in many new ways, some of which can be foreseen today, some of which cannot. The future force will require leaders who can operate and fight in a rapidly changing complex security environment, one where the traditional levels of warfare may become increasingly interconnected, compressed and blurred. As the Information Age evolves, military leaders and their teams will need to adapt to its complexity with an agility greater than their adversaries. Ensuring future leaders are suitably prepared and supported to achieve this presents one of the greatest challenges. An immediate issue is the lack of any common definitions for adaptability and agility resulting in these terms being perceived in many ways. In this section, descriptions are proposed and then used to consider adaptability and agility from organisational and leadership perspectives.

2.36. **Adaptability and agility.** To operate or fight at advantage, military organisations require leaders who can adapt with suitable agility to unexpected complex challenges.⁶⁶ However, with a current tendency for the terms ‘adaptable’ and ‘agile’ to be used interchangeably, their meaning has become blurred. To ensure a consistent approach to developing suitable preparation and support mechanisms for these skill sets, a standardised understanding and terminology is required.

2.37. **Describing adaptability and agility.** This future leadership publication considers adaptability as an ability and readiness to adjust to shifting conditions and circumstances in a world where volatility, uncertainty, complexity and ambiguity dominate.⁶⁷ But, to gain advantage in a context of persistent competition, there is a need for such adaptations to outpace adversaries. This required rate of adaptation is achieved through an agility that reflects the ease and pace with which a leader can adapt themselves, their teams and, for some, their organisations.

Describing adaptability and agility



Adaptability: the ability and readiness to develop alternative ways and means to achieve advantageous ends in response to shifting conditions.

Agility: the ease and pace at which a leader can adapt themselves and the people they lead.

2.38. **Understanding adaptability and agility.** Even with agreed descriptions, adaptability and agility can be interpreted differently depending on whether they are considered from the perspective of the organisation or individual. From the military organisational perspective, adaptability is predominantly determined in mechanistic terms of refining or changing bureaucratic structures and decision-making procedures.⁶⁸ From the perspective of our people, adaptability can be perceived in how they interact and collaborate with each other. A military organisation can only be considered as being truly adaptive with suitable agility if its understanding and practices of these competencies encapsulates both viewpoints.

2.39. **The organisational perspective.** Following a bureaucratic model, militaries represent organisations with distinct leadership hierarchies supported by rules and regulations. Established for dependency and predictability, great emphasis is placed on refining and adapting processes that provide order, efficiency, uniformity and control.⁶⁹ The senior leadership articulates the group purpose and behaviours, sets the goals and changes are coordinated through them. Subordinate leaders' roles are to translate the higher-level directives into tasks and lead their teams to achieve these desired objectives.⁷⁰ With its bureaucratic command and control structures, this can be considered as a 'top-down' approach to adaptation.

2.40. **Bureaucracy and complexity.** While good for generating efficiencies during stable conditions, a downside of this bureaucratic approach is the challenges it faces when required to adapt with

agility in response to emerging novel threats.^{ix} Its placing of functions into structural ‘stove pipes’ can restrict information flow across the organisation, thereby limiting areas access to its overall organisational diversity of thinking. For example, within most military organisations, strategy development is compartmentalised, which limits the availability, numbers and diversity of their cognitive ‘horsepower’. When challenged to adapt to complex (and more commonly unexpected) problems, militaries can quickly find themselves in a situation of cognitive overmatch.^x What can result organisationally is an inability to recognise or comprehend the dynamics of emerging novel complex challenges and for all intents and purposes the problems becoming ignored.⁷¹

2.41. The individual perspective. The exponential rise in global interconnectedness amongst people has become a primary driver for a world previously perceived as complicated, now being considered as complex.⁷² This relationship between people and complexity offers another perspective on how military organisations adapt. Complex adaptive systems are made up of numerous agents who are constantly self-organising and developing new emergent behaviours. These complex adaptive systems characteristics are also reflected in people who socially self-organise to cooperate to achieve common goals, outlooks or needs.

2.42. The individual and complexity. Through sharing differing knowledge, experience and ways of thinking amongst the group, novel ideas can emerge. The more diverse the knowledge, experience and ways of thinking are, the more likely a group will formulate ways to navigate complex problems.⁷³ Through such learning and adapting, that group gains advantage within their surrounding environments.⁷⁴ As this occurs naturally without specific higher-level organisational direction, it can be considered as a ‘bottom-up’ approach to adapting.

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 ix Also referenced in leadership literature as ‘Black Swan moments’. Talib Nassem.
 x This overload can result in analysis paralysis where leaders’ desire for even more detail and analysis of the data can bring decision-making to a grinding halt and approval paralysis where people will only act with approval from their command chain.

2.43. **The fusion of ‘top-down’ and ‘bottom-up’.** While these differing perspectives may seem contradictory to each other, both have their place in how military organisations can adapt their ways with suitable agility. For adaptability to thrive, future leaders need to ensure a delicate balance between control and freedoms. Too much emphasis on the ‘top-down’ approach and a military’s ability to adapt will be slow and cumbersome; too much emphasis on the ‘bottom-up’ approach can lead to responsive but incoherent solutions. For military organisations to gain advantage through their capability to adapt with suitable agility they need to reconcile and balance both adaptive approaches together.⁷⁵

The fusion of ‘top-down’ and ‘bottom-up’ adaptive leadership – it is not new



During the 1944 Normandy Campaign, Sergeant Curtis G. Culin, 2nd United States Armoured Division, and his team adapted anti-tank obstacles into hedge-breaching devices that could be attached to the front of Sherman tanks. These device allowed the tanks to breach the hedgerows, and earth embankments on which they stood, without exposing the tank’s vulnerable underside to enemy fire. Upon seeing the device, General Omar Bradley embraced the prototype. Through a fusion of ‘bottom-up’ and ‘top-down’ adaptability exercised with agility, the hedge-breaching device was quickly brought into mass production⁷⁶ and wide-scale use.

2.44. **The sub-threshold dimension and hybrid environment.** The next section offers context for the need for adaptable and agile military leaders. The West is confronted by adversarial hybrid activities that threaten all levers of a nation’s power. While aggressive in nature, they occur below the threshold of armed conflict. In countering these threats in the future, it is likely that military organisations will form a large element of their national hybrid response. The next section considers how such activities occurring outside of the traditional military sphere could generate novel challenges for future leaders.

Insights



- A military organisation's ability to adapt the ways in how it operates and fights with suitable agility is critical to gaining advantage over adversaries.
- The complex nature of the future operating environment requires a better understanding of how people adapt. While 'bottom-up' adaptations offers a diversity of thinking required in complex problems, it can be perceived as threatening to the 'top-down' bureaucratic organisational status quo. Any stifling of such 'bottom-up' approaches to adaptability will constrain military organisations' future ability to innovate and develop novel solutions.⁷⁷

Section 5 – Leading in the hybrid and sub-threshold

2.45. **Introduction.** As one of the primary 'battlefields' of the future operating environment, activities in the sub-threshold will occur across a hybrid of military, political, economic, societal and information spheres. Future military leaders will be exposed to a far broader and unfamiliar range of problems, which could be exacerbated by an inability to engage suitably within the diverse groups of the hybrid environment. This section explores the inherent leadership challenges of leading in the sub-threshold dimension and hybrid environment.

2.46. **The changing 'rules'.** A characteristic of the future operating environment will be in its diversifying and proliferating threats outside of our legal and political norms that blur the distinction between war and peace.⁷⁸ While they may emerge both above and below the threshold of armed conflict, it is in how military leaders counter these threats in the sub-threshold that is currently less developed.

2.47. **The sub-threshold.** While the sub-threshold is commonly associated with the threshold of armed conflict, there are many such thresholds with no distinct boundaries between them. For example, an adversary may want to keep their activities below the threshold of detection; if detected, below the threshold of understanding; if understood, below the threshold of decision; and, if decided, below the threshold of response. An adversary will attempt to make the level and strength of every threshold ambiguous to allow their aims to be met.⁷⁹

2.48. **Leading in the sub-threshold.** As the setting of thresholds is informed by an individual's subjective risk tolerances, leaders can be particularly influenced by, and vulnerable to manipulation in terms of their perceptions and indeed emotions of ongoing activities.⁸⁰ By tailoring their attacks to stay below detection, response and/or international legal thresholds, adversaries can generate ambiguity and use it as a weapon. With such activity acting to amplify volatility, complexity and uncertainty, decision-making processes can be further impeded undermining a leader's ability to lead and enact focused responses.

2.49. **Hybrid activity.** Activities in the sub-threshold target vulnerabilities across societies using all instruments of national power. This hybridity can present numerous complex outcomes that are difficult to identify and understand using traditional military approaches. As hybrid activities can be novel and diverse, they can remain undetected until well established and their damaging effects have already begun manifesting themselves.⁸¹

2.50. **Countering hybrid.** When focused in the sub-threshold, the pervasive and non-attributable nature of hybrid activities can serve to disrupt and impede decision cycles across a broad range of organisational spheres of responsibility.⁸² This could generate pulls for future military leaders to work more frequently inter-agency, cross-government and multinationally.⁸³ This will require future leaders to adapt to differing cultures and ways of operating by having a broader range of leadership styles and thinking skills.

2.51. **Leading in the hybrid environment.** Due to its wider implications,^{xi} it will be unlikely that military organisations will be the leading organisation in a hybrid-based national crisis response. Operating in such a cross-government departmental environment will require future military leaders to be conversant with the differing and diverse group cultures. A way of achieving this will require early exposure to these non-military environments and mentoring in the differing organisational values and approaches.⁸⁴ Without this preparation, military leaders' effectiveness within these differing organisational contexts, roles and cultures could be undermined.

2.52. **Mission command in the hybrid environment.** While a military concept, the mission command tenets reflect the leadership attributes required when operating with other organisational teams. Whether military or civilian, public or private sector, mission command offers universal leadership building blocks with which to build and enable cooperation.

Insights



- Sub-threshold advantage will be predominantly realised through cross-government and inter-agency hybrid activity.
- Within a future hybrid operating environment, military leaders will need to be suitably prepared in the differing and diverse group and organisational cultures participating in the hybrid operations. Within such a complex human landscape, it will be beneficial to offer suitable exposure to other government departments and agencies participating in hybrid activities.
- The greater diversity of people and organisational cultures within the hybrid environment will require future leaders to be conversant with a broad range of leadership styles.
- This hybrid leadership support task will be concurrent (and in addition) to maintaining leaders' future evolving military fighting knowledge, skills and expertise.

.....
xi Global, national and pan-government.

“

The effective integration of humans and artificial intelligence enabled systems within data analysis, planning, decision-making and delivery of effects will become increasingly important.

”

M. Boardman and F. Butcher⁸⁵

Chapter 3

The impact of technology

Section 1 – Artificial intelligence and appropriate human control

3.1. **Introduction.** Traditionally, warfare has been a human endeavour with technology developed to augment physical military ‘muscle’. Already, witnessed today, artificial intelligence-enabled technologies have the power to augment human cognition as well. These artificial intelligence-enabled decision-making and autonomous systems will have significant impacts on how future leaders sense, understand and then orchestrate effects. Using ongoing North Atlantic Treaty Organization (NATO) research,⁸⁶ this chapter considers the challenges in how future leaders can co-exist with these future artificial intelligence-enabled systems.

3.2. **Artificial intelligence.** From a technical standpoint, artificial intelligence is the use of statistical algorithms to perform tasks that have previously been considered to require human intelligence.⁸⁷ Its level of sophistication is considered in terms of its learning methods. At the left of arc, ‘narrow artificial intelligence’ usually reflects human programmed algorithms, and at the right of arc there is ‘general artificial intelligence’ whose characteristics reflect the human approach of automatically improving through its experience and learning from carrying out tasks.⁸⁸

3.3. **Artificial intelligence and future leaders.** As artificial intelligence-enabled systems are adopted by militaries worldwide, there is a need to understand how they relate to, integrate with, and can be controlled by human leadership. Ongoing research by NATO is identifying how **appropriate** human control of artificial intelligence-enabled systems can, or more importantly cannot, be applied. This emphasis on ‘appropriate’ control encompasses not just authority, accountability and responsibility but also considers moral, ethical and legal aspects.

3.4. **Appropriate control.** While artificial intelligence-enabled technologies potentially offer significant benefits to how modern militaries operate and fight, the many complex socio-technical, legal, moral and ethical questions will be greatly influenced by national cultural biases.^{xii} However, when Multinational Capability Development Campaign (MCDC) nations' participation in multinational operations is considered, this subject cannot just be limited to national discussion. Emerging from ongoing international research and experimentation carried out by NATO scientists, Figure 3.1 illustrates how appropriate control has been classified into elements of 'meaningful' and 'effective' human control.⁸⁹

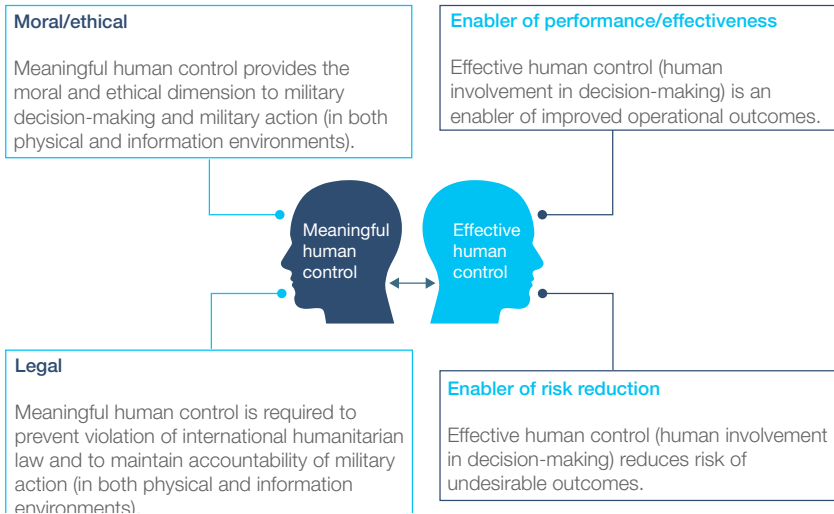


Figure 3.1 – Meaningful and effective human control⁹⁰

3.5. **Meaningful human control.** A focus of ongoing discussions in the development of artificial intelligence-enabled systems is in the ethical and legal use and control of autonomous weapons systems. The ongoing debates all emanate from a central ethical question of the accountability of such systems and the need (or not) for human control.⁹¹ As what

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xii A recent study on the acceptance of lethal autonomous weapons came up with the following findings: support for fully autonomous weapons is strongest in India (50%) and Israel (41%). The strongest opposition is in Turkey (78%), South Korea (74%), and Hungary (74%). Source Ipsos.

is deemed ethically and legally acceptable will always be defined by the society of the time,⁹² and might differ from country to country, this publication does not extend to a position on the current debates but rather considers the role of ethics itself and their relevance for future leaders.

3.6. **Ethical frameworks.** For future leaders, the potential to ‘empower’ artificial intelligence-enabled systems in decision-making could raise many ethical challenges and even dilemmas in terms of not ‘can I’ but rather ‘should I’ or even ‘must I’. Managing such dilemmas can place great professional and personal demands on leaders in many differing ways. Whether from ethos, legal or military judgement perspectives, ethical frameworks can provide important guidance in how leaders should act. With the introduction of artificial intelligence-enabled systems into decision-making and autonomous vehicles, future leaders will require education and training support in addition to ethical frameworks to comprehend and manage potentially conflicting artificial intelligence-based moral and ethical issues.⁹³

3.7. **Legal.** As with ethics, the legal perspective can change as societies change. However, currently, for MCDC member nations, a machine cannot be legally held accountable for an action it carries out. While a human can be held legally accountable, in the use of artificial intelligence-enabled systems there remains debate on who would be liable: manufacturer, algorithm designer, operator, commander or the sovereign state? This represents a complex problem.⁹⁴

3.8. **The adversarial ‘vote’.** The task to resolve these issues is complex because being dynamic and multidimensional, the level of control required is dependent on the sophistication of the artificial intelligence-enabled system, the task and the scenario in which it will be used.⁹⁵ However, while the militaries of liberal democracies could be constrained by these factors, many of our adversaries will not. The threat and advantage this could offer adversaries may become an important factor for ongoing moral, ethical and legal considerations.

3.9. **Artificial intelligence and decision-making.** Figure 3.2 shows the classification of levels of artificial intelligence-enabled analysis. With the information summaries produced by narrow artificial intelligence being further evaluated by human specialists, human judgement remains as the ‘central processor’ for these decisions. The human-machine output that is required by these less sophisticated artificial intelligence-enabled systems provides inherent effective human control and raises few, if any, ethical issues.^{xiii}

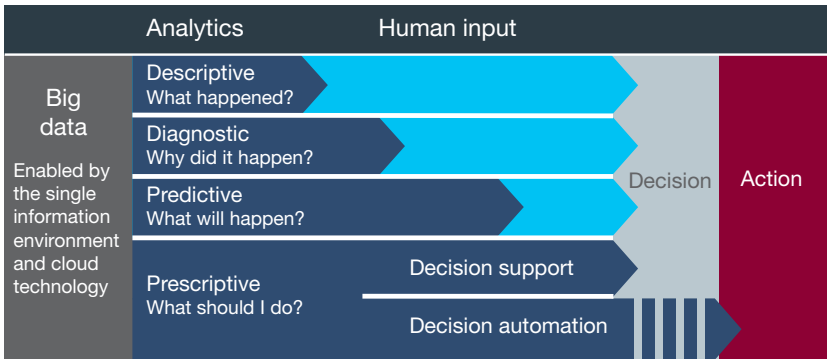


Figure 3.2 – Types of artificial intelligence analytics capability⁹⁶

3.10. **Prescriptive artificial intelligence.** The next epoch of artificial intelligence-enabled systems (already being employed in some areas today) is using artificial intelligence as the primary decision-maker. Due to human limitations,^{xiv} it can be deemed morally and legally acceptable to delegate simple (non-lethal) decisions involved in repetitive tasks to an artificial intelligence-enabled system. While such prescriptive activity can offer efficiencies in terms of offloading human decision-makers and potentially more consistent and objective decisions for those activities, international agreements have yet to be reached regarding ethical frameworks.⁹⁷

xiii Using this level of artificial intelligence will not per se create or dictate new moral or ethical standards, it simply mirrors or makes transparent the standards and biases of those who created the algorithm and/or selected the data.

xiv For example, in terms of bias or the inability for humans to maintain mental focus during repetitive activities.

Insights



- As military organisations adopt artificial intelligence-enabled systems, its leaders need to be suitably prepared and supported to affect appropriate human control of these systems.
- When operating and fighting with artificial intelligence-enabled technologies, future leaders should have access to suitably endorsed ethical frameworks to guide them through situations of potentially conflicting moral values, norms and ideals.⁹⁸
- As MCDC military organisations adopt artificial intelligence-enabled systems in greater numbers, the legal position of artificial intelligence use and accountability requires resolution to ensure their future leaders using such technologies are suitably safeguarded.

Section 2 – Artificial intelligence as a decision-making tool

3.11. **Introduction.** Able to process the volume, variety, veracity and velocity of data at speeds and accuracy unachievable by humans, artificial intelligence-enabled systems offer great potential in supporting problem-solving and decision-making. However, the impacts of their use will not be exclusive to future leaders but will also affect those they lead. This section considers the use of artificial intelligence-enabled systems on leadership itself.

3.12. **Artificial intelligence and leadership.** Today, artificial intelligence-enabled systems offer opportunities to better exploit information and improve human understanding, decision-making and increase the tempo of activity.^{xv} In the future, these systems' support to commander's decision-making could also enable command and

xv This is particularly relevant when using artificial intelligence algorithms to detect or recognise unusual patterns in huge databases and finding the proverbial 'needle in the haystack'.

control structures in headquarters to potentially use different hierarchical structures that require fewer personnel.⁹⁹ However, although providing an allure of competency and potential cost savings, introducing such technologies can present unforeseen challenges and therefore needs to be thoroughly experimented.

3.13. **Artificial intelligence as a barrier.** Responsibility, transparency, auditability, incorruptibility, predictability, empathy and compassion are but some of the conscious and unconscious social criteria that apply to human judgement day to day. Traditionally, military leaders' problem-solving and decision-making has included the people in accordance with the respective national leadership and command and control culture. This inclusivity to the decision-making process provides both awareness and ownership of the decisions made to all involved. As artificial intelligence-enabled decision-making potentially becomes the primary choice to support leaders, it could act as a barrier that disassociates a leader from their human teams, as well as constraining diversity of thinking.¹⁰⁰

3.14. **Trust.** Particularly within the military context, the interpersonal trust between a leader and the people they lead acts as a bond that coheres the force and allows it to function effectively, especially under combat conditions. Such trust depends on several factors such as perceived competence, compassion, clear understandable direction, and if something goes wrong, the degree to which a leader can reassert control. Such factors also relate to trust in artificial intelligence-enabled systems. As with interpersonal trust, once lost, trust in artificial intelligence-enabled systems can be hard to re-establish. However, a person is more likely to forgive a breach of trust by another person than by a 'machine'.^{xvi} As military organisations adopt artificial intelligence-enabled systems in the future, any imbalance in people's trust calculus for human-machine developed decision-making could serve to undermine that team or unit's fighting cohesion and subsequent effectiveness.¹⁰¹

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xvi As a rule of thumb, currently for a system to be trusted it must be assessed to be ten times safer than a human.

3.15. **Technical assurance.** As artificial intelligence-enabled systems continue to evolve and become more sophisticated, there is a risk that the technology could outpace future leaders' technical understanding of what decisions artificial intelligence should, and should not, inform or make. When under pressure, a plausible outcome could be for a future leader without suitable access to technical knowledge, and when confronted with a dynamic scenario and time pressures, choosing to 'believe' artificial intelligence analysis whose analytical design limitations makes its use inappropriate at that moment. Such over-reliance by leaders or ill-advised usage that sets the wrong precedents, could result in the loss of appropriate leadership control.¹⁰²

3.16. **Artificial intelligence and leader development.** The expected growth of prescriptive artificial intelligence-enabled systems to make less contentious decisions could result in less experienced leaders having fewer opportunities to develop their judgement through making such decisions. No senior officer or warrant officer ever made their first decision conceiving high-level strategy, but rather developed their judgement whilst in more junior positions making decisions for non-controversial or straightforward tasks.

3.17. **Over-reliance on artificial intelligence.** Any capability, whether armoured fighting vehicles, frigates or fighter aircraft, creates its own dependencies and such dependencies generate vulnerabilities.¹⁰³ It has been discussed how artificial intelligence can support future leaders to better comprehend emerging situations and make suitable and timely decisions to gain advantage over adversaries. However, while using artificial intelligence is the likely future, a total reliance on it could serve to undermine the quality and effectiveness of military leadership in the event their artificial intelligence-enabled systems are denied to them and they are called upon to make decisions using only human resources.

Insights



- The potential for the use of artificial intelligence-enabled systems in decision-making to act as barriers that disassociates leaders from those they lead requires further investigation and understanding.
- Without suitable technical education and training support, the evolving sophistication of artificial intelligence-enabled systems could become incomprehensible to leaders, leaving them unable to apply appropriate control.¹⁰⁴
- Artificial intelligence support to leaders presents many benefits but may also serve to undermine intrinsic decision-making skills. To ensure force resilience as artificial intelligence-enabled systems becomes more prominent, there is a need to maintain future leaders' abilities to operate and fight in artificial intelligence denied, reversionary environments.

Section 3 – Artificial intelligence-enabled autonomous systems

3.18. **Introduction.** The image of artificial intelligence-enabled weaponry operating independently and self-directing their activity fails to reflect the basic tenets of military command or appropriate human control. As military personnel require leadership and orders to define their freedoms of action within a mission or task, so will artificial intelligence-enabled autonomous machines. This section considers how the introduction of more sophisticated artificial intelligence-enabled systems capable of autonomous activity may impact on future leaders.

3.19. **Automatic, automation and autonomous.** Automatic features typically relate to software or hardware that have a threshold that triggers an event, like a pressure regulated switch. Automation refers to applications that operate without external guidance but within a strict

set of rules and procedures. Choice is usually a question along very deterministic chains of events. Car or machine factory production lines are an example of this. Autonomous^{xvii} refers to an extended automation that can analyse its environment and not only choose, but also adapt and even create its options for activities. Sophisticated network intrusion and safety software that adapt to new types of threats are typical examples of autonomous systems seen today.

3.20. The ethics of autonomous operations. As the most contentious area of autonomous operations, this section focuses on future leaders' use of autonomous weapon systems. Currently, the methods of how to effect meaningful human control of autonomous weapon systems have many differing ethical interpretations depending on who is making them. These ethical disputes show no signs of ending any time soon and could remain an area of ongoing contention for future leaders in how they are able to apply meaningful control of all artificial intelligence-enabled autonomous systems whether directly lethal or not.¹⁰⁵

3.21. Levels of autonomous operations. A principle question relating to using autonomous weapon systems, is who, human or machine, makes the lethal decisions. In defining levels of autonomy there are typically at least three separate but parallel factors in play: the human-machine command and control relationship; the sophistication of the machine; and the type of decision being made by a machine.

3.22. Mission command in autonomous operations. The philosophy of mission command can be considered as controlling human autonomous activity by giving freedoms to subordinate leaders to make decisions that can achieve a commander's intent. By translating the mission command philosophy across to upcoming artificial intelligence-enabled autonomous operations, it raises two potential challenges for future leaders. The first is the need for an organisational leadership culture^{xviii} that is comfortable (and in agreement) in what defines appropriate human control and how it is applied to all artificial intelligence-enabled autonomous operations. The second is the need for **all** leaders involved in such autonomous

xvii As of today, even the United Nations talks on lethal autonomous weapon systems in Geneva are not able to agree on a precise definition of 'autonomous'.

xviii This acceptance will need to be part of the political as well as military culture.

operations to have suitable access to technical assurance to appropriately control them.

3.23. **Effective human control.** A role for future leaders will be to enable the most effective and efficient use of autonomous systems. Such control can be considered as a leader's competency to balance a machine's autonomous capabilities with its freedoms to operate autonomously. If this balance is not achieved it could result in the following consequences.

a. **Under-utilisation.** While an artificial intelligence-enabled autonomous system may be sufficiently competent to perform a mission set, human intervention may limit its autonomous freedoms. In being prevented from fully exercising its autonomous capabilities it can be considered as under-utilised.

b. **Over-trust.** The reverse of under-utilisation, and more serious for future leaders and wider defence, is to allow an autonomous system to operate too freely in a situation that outstrips its capabilities. This can be considered as a leader over-trusting a system and losing appropriate control of it.

c. **Burden.** The introduction of artificial intelligence-enabled autonomous systems will be at a cost to defence budgets that will likely require compensating reductions in other capability areas. In the event of an autonomous system not being able to carry out its delegated tasks, this will need to be backfilled by other assets. The consequences of this burden to a commander, particularly in the event human units are required to backfill, could become a notable challenge.

3.24. **Human or machine.** When deciding whether to place humans in danger, tasking an artificial intelligence-enabled autonomous machine in their stead can present as an attractive option, not just for the immediate commander, but for higher levels of authority. This could present major challenges for future leaders because as well as the extant ethical and technical dilemmas they need to resolve, they will also have to navigate potentially disparate and contradictory injects from differing areas of perceived authority or oversight.

Insights



- Currently, within liberal democracies the use of autonomous military systems remains contested. While MCDC partner nations may be limited by this, our adversaries may not. Until this is resolved, our future military leaders could be placed at a disadvantage.
- As the use of artificial intelligence-enabled systems becomes more common, leaders will need suitably agreed ethical frameworks for their use.
- Due to the potentially contentious nature of artificial intelligence-enabled autonomous operations, the complexity of stakeholder engagement (political, ethical, media to name a few) could present many challenges to future leaders controlling such activity.
- The speed and unpredictability of artificial intelligence development means its use by future leaders will require regular reassessment.

“

Culture can be considered as the way we think, feel and respond to information or events.

”

Geert Hofstede¹⁰⁶

Chapter 4

Changing organisational culture

4.1. Introduction. The Multinational Capability Development Campaign (MCDC) partner nations each convey a broad range of characteristics that reflect their national cultures. While these may stand to differentiate us, as professional military organisations, we all share much closer organisational cultures. It is in these organisational cultures where this publication focuses. This publication has highlighted how we are confronted by emerging factors such as hybrid operations, operating in the sub-threshold and adopting advanced technologies. In response, it is likely that there will be a need to change current military cultural approaches and mindsets and develop new ways in how our military organisations may operate and fight. While it is common to witness a call for such cultural change within institutions, within many military organisations there remains a seeming lack of understanding as to what this requires.¹⁰⁷ Without proper comprehension and consideration for both the complex conscious and unconscious cultures influencing its change programmes, any future attempts will likely fail.¹⁰⁸ This final chapter considers the constituents that make up culture and the challenges that this presents to our military organisations in changing them.

4.2. The cultural iceberg. Culture can be considered as the way we think, feel and respond to information or events.¹⁰⁹ In response to the future operating environment, MCDC partner nations may need to introduce new mindsets (or culture) within their militaries in how they operate and fight, and indeed lead. While traditionally, military organisations have been able to alter people's conscious cultural behaviours through process, regulations or threat of sanction, its ability to change their unconscious, deeper-set cultures has not been so clear cut.¹¹⁰ Figure 4.1 shows culture considered as an 'iceberg' with a person's unconscious cultural drivers unseen beneath the surface. When developing new ways, understanding this aspect is critical as it is from these unconscious cultures that resistance to change predominantly stems.¹¹¹

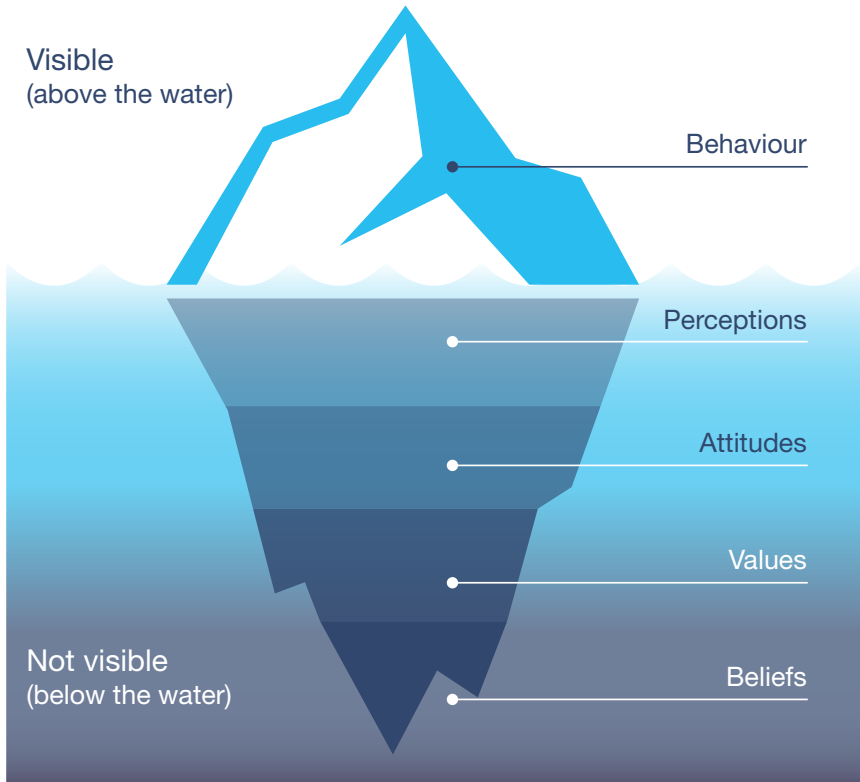


Figure 4.1 – Schein's cultural iceberg¹¹²

4.3. **Perceiving culture.** From the outset, changing unconscious cultures raises challenges for militaries. As professional organisations they consist of a broad range of people and specialisations that reflect a diverse range of cultures; this diversity is expected to continue to increase.¹¹³ For large institutions, especially military ones, traditions and ethos play an important role in defining the culture, leading to this culture being perceived as 'owned' by the organisation.¹¹⁴ This perception can result in change programmes focusing primarily on the institution rather than the people within it and misjudging the complexities inherent in human culture.¹¹⁵

4.4. **Leading cultural change.** Within many military organisations such approaches have resulted in oversimplified cultural considerations within its change programmes that have generally resulted in changes not occurring. To be suitably prepared to lead change, future leaders will need to be sufficiently cognisant of what is required in changing culture. Without suitable understanding of the subsequent time, resources and engagement required to enact such change,¹¹⁶ any change attempt will likely fail.¹¹⁷

Insights

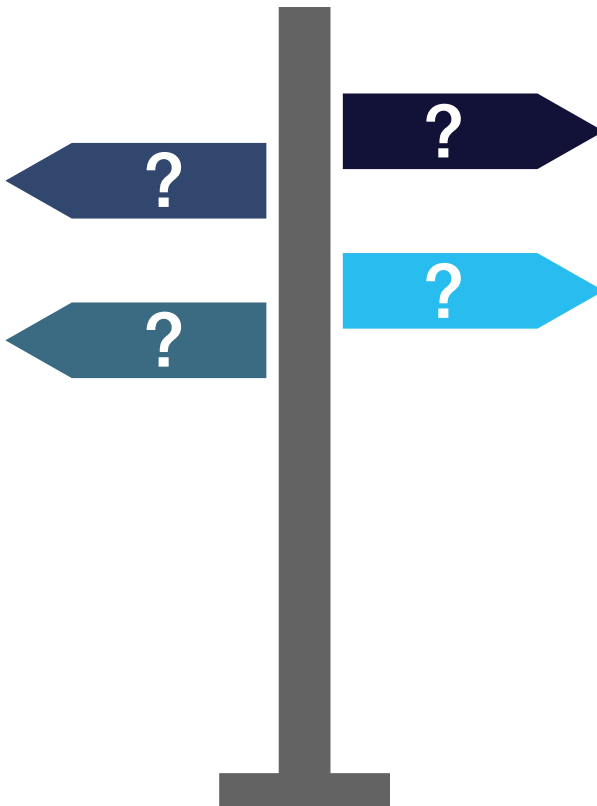


- Current military approaches to organisational cultural change often misjudges the inherent complexity and subsequent time, resources and engagement required to achieve it.¹¹⁸ Continuing to lead using current approaches will only result in our military organisations achieving a veneer of behavioural change that will be temporary at best.¹¹⁹
- A first step in being able to comprehend the necessary approaches to cultural change is to first change its thinking cultures to a more critical approach.¹²⁰
- As with how they should adapt, MCDC partner nations' organisational change programmes must not only consist of a bureaucratic organisational 'top-down' approach but should also include suitable 'bottom-up' collaborative engagement that considers the unconscious cultural needs and concerns of its personnel.

Notes

Next steps

This publication has analysed the expected future operating environment from a perspective of military leadership. Its insights not only reflect a broad spectrum of leadership research but also conveys the thoughts and ideas of serving military leaders from corporal rank upwards. However, this publication has only taken the first step of what is required. The next steps are for you, the reader, to apply this analysis to the context of your own nation, military service, professional specialisation and/or mission sets. It is through taking these next steps that the diversity of thinking may be harnessed and the ways to suitably prepare and support future leaders identified.



Notes

Acknowledgements

MCDC Project members and affiliated organisations

United Kingdom

- Development, Concepts and Doctrine Centre, UK Ministry of Defence
- Defence Science and Technology Laboratory, UK Ministry of Defence

Germany

- German Institute for Defence and Strategic Studies
- Bundeswehr Office for Defence Planning
- German Joint Staff College

Austria

- Ministry of Defence

Czech Republic

- University of Defence

Canada

- Professional Development Directorate, Canadian Defence Academy

Denmark

- Royal Danish Defence College

Finland

- National Defence University

Italy

- Aeronautical Military Science Institute

NATO

- Joint Force Development, Headquarters Supreme Allied Command Transformation
- Joint Warfare Centre
- NATO School Oberammergau

Poland

- Doctrine and Training Centre of Polish Armed Forces

Romania

- Romanian Land Forces Academy
- Romanian Air Force Academy

Spain

- Centro Superior de Estudios de la Defensa Nacional
- Professor José Miguel Fernández-Dols, Universidad Autónoma de Madrid

Sweden

- Militärhögskolan Halmstad

Switzerland

- Swiss Federal Department of Defence

Independent consultation

- Professor Harald Schaub
- Professor Colin Williams

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