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COMPETITIVE DEFENCE: SHAPING THE FUTURE

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COMPETITIVE DEFENCE: SHAPING THE FUTURE

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José Paulo Silva Bartolomeu

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Abstract

This thesis examines how modern defence organisations can sustain strategic advantage in an era of enduring uncertainty by developing a practicable concept and operational framework of competitive defence. The research problem identifies three interlinked challenges: (1) unresolvable uncertainty in the strategic environment, (2) structural and institutional barriers that fragment planning and procurement, and (3) behavioural dysfunctions—ambition, cognitive bias, rent-seeking, and corruption—that distort decision-making. The study pursued three specific objectives: to design adaptive frameworks for planning under uncertainty; to propose institutional reforms that reduce fragmentation and strengthen interoperability; and to develop measures to mitigate behavioural and governance risks. The study used an abductive, realist-informed, multi-method qualitative design. Documentary analysis, a process-tracing analysis of NATO's adaptation (2014–2025), and structured comparative case studies (Belgium, Canada, Austria, Ukraine) were conducted, with triangulation employed to validate findings. The research demonstrates that uncertainty is structural rather than episodic; adaptive planning tools—including scenario libraries, red-teaming, horizon scanning—proved indispensable for managing complexity. It further finds that institutional reforms must be complemented by behavioural measures, and that a persistent implementation gap exists between foresight capabilities and downstream acquisition agility. The thesis sustains that competitive defence is best conceptualised as a seven-domain, dual-track framework (structural + behavioural), that is modular, audit-anchored and operationally actionable, however requires phased implementation, independent verification, and broader empirical testing beyond Euro-Atlantic cases. Important limitations include the focus on Western cases and reliance on open or documentary sources. The study therefore recommends wider geographic validation and primary data collection (Subject Matter Experts interviews) to strengthen external validity.

Keywords:

Competitive defence; Adaptive planning; Institutional reform; Procurement governance; Corruption risk

Resumo

Esta tese analisa de que forma as organizações de defesa modernas podem sustentar uma vantagem estratégica numa era de incerteza persistente, através do desenvolvimento de um conceito exequível e de um quadro operacional de defesa competitiva. O problema de investigação identifica três desafios interligados: (1) a incerteza irresolúvel do ambiente estratégico; (2) as barreiras estruturais e institucionais que fragmentam o planeamento e o processo de aquisição; e (3) as disfunções comportamentais—ambição, enviesamento cognitivo, *rent-seeking* e corrupção—que distorcem a tomada de decisão. O estudo prosseguiu três objetivos específicos: conceber metodologias adaptativas para o planeamento em condições de incerteza; propor reformas institucionais que reduzam a fragmentação e reforcem a interoperabilidade; e desenvolver medidas que atenuem os riscos comportamentais e de governação. Foi adotado um desenho metodológico qualitativo, multimétodo, de orientação realista e baseado num raciocínio abdutivo. Foram realizadas uma análise documental, uma análise de *process tracing* da adaptação da NATO (2014–2025) e estudos de caso comparativos estruturados (Bélgica, Canadá, Áustria e Ucrânia), recorrendo à triangulação para validar os resultados. A investigação concluiu que a incerteza é estrutural e não episódica; que as ferramentas de planeamento adaptativo—como as bibliotecas de cenários, *red-teaming* e *horizon scanning*—se revelam essenciais; que as reformas institucionais devem ser acompanhadas por medidas de natureza comportamental; e que persiste um desfasamento significativo entre as capacidades de antecipação e a agilidade dos processos subsequentes de aquisição. A tese sustenta que a defesa competitiva deve ser conceptualizada como uma metodologia modular, auditável e operacionalizável, estruturada em sete domínios e assente numa lógica dual (estrutural + comportamental), cuja implementação requer uma abordagem faseada, verificação independente e validação empírica alargada, para além dos casos euro-atlânticos. Entre as limitações mais relevantes destacam-se o foco em casos ocidentais e a dependência de fontes documentais abertas. O estudo recomenda uma validação geográfica mais alargada e o recurso a fontes primárias (nomeadamente entrevistas a especialistas) de forma a reforçar a validade externa.

Palavras-chave:

Defesa competitiva; Planeamento adaptativo; Reforma institucional; Governação dos processos de aquisição; Risco de corrupção

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List of abbreviations, initialisms, and acronyms

A

ACT Allied Command Transformation

AI Artificial Intelligence

AA Added Activity

AAR After-Action Report

B

BANI Brittle, Anxious, Nonlinear, Incomprehensible

C

C2 Command and Control

C2COE Command and Control Centre of Excellence

CAS Close Air Support

CI Critical Infrastructure

CJADC2 Combined Joint All-Domain Command and Control

CJCS Chairman of the Joint Chiefs of Staff

CJEF Combined Joint Expeditionary Force

CSO Civil Society Organisation

CMO Context-Mechanism-Outcome

D

DIANA Defence Innovation Accelerator for the North Atlantic

DIU Defense Innovation Unit

DIME Diplomatic, Informational, Military and Economic instruments

DoD Department of Defence

DOT State Operator for Non-Lethal Acquisition

DPA Defence Procurement Agency

E

eFP enhanced Forward Presence

EU European Union

EUROMIL European Organisation of Military Associations and Trade Unions

F

FAR Federal Acquisition Regulation

FFAO Framework for Future Alliance Operations

FPV First-Person View

G

GDI Government Defence Integrity Index

H

HR Human Resources

I

ISED Innovation, Science and Economic Development Canada

J

JALLC Joint Analysis and Lessons Learned Centre

JCS Joint Chiefs of Staff

JDAs Joint Duty Assignments

JEF Joint Expeditionary Force

JERIC2O Joint Effects for Real-time Integrated Command and Control Operations

JLLIS Joint Lessons Learned Information System

JPME Joint Professional Military Education

K

KIM Knowledge & Innovation Management

KPI Key Performance Indicator

L

LOI Letter of Intent

M

M&E Monitoring and Evaluation

MoD Ministry of Defence

MOSA Modular Open Systems Approach

MOU Memoranda of Understanding

N

NABU National Anti-Corruption Bureau of Ukraine

NACP National Agency for Corruption Prevention

NAKO Independent Defence Anti-Corruption Committee

NATO North Atlantic Treaty Organization

NDU National Defense University

NGO Non-Governmental Organisation

NI Not Identified

NORDEFCO Nordic Defence Cooperation

O

OECD Organisation for Economic Co-operation and Development

P

PBL Performance-Based Logistics

PME Professional Military Education

PMESII-PT Political, Military, Economic, Social, Information, Infrastructure, Physical Environment, and Time variables

PPBE Planning, Programming, Budgeting, and Execution

PV Partially Verified

R

RAND Research and Development

RQ Research Question

RECOBIA REduction of COgnitive BIAses in Intelligence Analysis

RIO Risk, Issue, and Opportunity

S

SAPO Specialised Anti-Corruption Prosecutor's Office

SFA Strategic Foresight Analysis

SIGMA Support for Improvement in Governance and Management

S&T Science & Technology

STEEPVL Social, Technological, Economic, Environmental, Political, Values, Legal

STO Science & Technology Organisation

SWOT Strengths, Weaknesses, Opportunities, and Threats

T

TCO Total Cost of Ownership

U

UK United Kingdom

U.S. United States

U.S.C. United States Code

V

VUCA Volatile, Uncertain, Complex, Ambiguous

1. Introduction

This first chapter embarks on an in-depth examination of the complex dynamics shaping defence organisations within an increasingly competitive global environment. It critically engages with the central problem statement, underscoring the multifaceted challenges these organisations encounter, including operational, strategic, and institutional pressures. These challenges include unresolvable uncertainty, structural and institutional barriers, ambition, bias, and corruption, each contributing substantially to the overall complexity of the defence landscape. In underscoring the significance and rationale for this study, the chapter meticulously outlines its objectives, research questions (RQs), scope, limitations, and delimitations. Additionally, it provides a comprehensive overview by defining key terms and culminates in a summary, effectively laying the groundwork for subsequent chapters.

1.1 Context and background: competitive environment

Since 1987, the characterization of the environment as volatile, uncertain, complex, and ambiguous (VUCA) by the United States (U.S.) Army War College has resonated widely, permeating both military and civilian literature focused on strategy and planning (U.S. Army Heritage and Education Center, n.d.). However, a recent proposition by Jamais Cascio (2020) introduces a new concept, labeling the present era as “an age of chaos,” under the term BANI—representing brittleness, anxiety, nonlinearity, and incomprehensibility. Within this framework, the illusory strength of systems, coupled with anxiety magnified by media exposure in a nonlinear and incomprehensible world, lays the groundwork for understanding the innovation and proliferation of current and impending threats faced by nations.

The end of the Cold War in 1991 led to a period of American military dominance. However, a series of events have since challenged this supremacy, including North Korea’s acquisition of nuclear weapons, the September 11 attacks and subsequent intervention in Afghanistan, the advancement of sensing and precision guidance technologies, *coups d’état* and political instability in the Western Sahel, Russia’s military aggression in Ukraine, China’s rapid economic growth alongside military modernization, territorial disputes involving China, Israel-Hamas war, Israel-Iran war, and Yemen’s Houthi rebel attacks in the Red Sea. These events have collectively contributed to a decline in the military balance within strategically critical regions.

In national security and defence, various types of competition revolve around rivalling for limited resources. The scarcity of these resources stands as the fundamental characteristic of all forms of competition. When a critical resource becomes more plentiful or an effective substitute is created, the intensity of competition diminishes. Conversely, when a resource becomes scarcer or substitutes are removed, competitive pressures escalate. Even in ideological competition, the quest for scarce resources persists. An ideology becomes competitive when its aim is to gain control of political power through electoral victories, policy changes like wealth redistribution, or revolutionary actions, all of which involve vying for limited resources such as votes, tax revenues, or dominance in warfare (Hill & Watson, 2019, p. 21).

A competitive advantage in national security and defence can take various forms, such as a distinct or leading access to valuable resources, control or significant influence over critical decisions, or the ability to exert destructive, coercive, or compelling actions against an adversary.

The competition in national defence occurs on two main fronts. Externally, it involves engagements with other entities, such as violent battles (Keupp, 2021, p. 67)—a sort of Darwinian competition where the fittest survive and the unfit are destroyed or compelled to surrender. The occurrence of unanticipated surprises and the failure of predictions can be attributed to the constant competition of measures and countermeasures, the inclination to overlook vulnerabilities that adversaries subsequently exploit (Davis, 2003, p. 133), shortcomings in design or implementation (Ivančić, 2013), and a lack of understanding regarding the frictions of warfare (Clausewitz, 1989, pp. 117–118).

Additionally, there is international competition among states and systems for influence, allies, economic resources, access to markets, and human capital. Numerous global politico-military issues can be attributed to conflicts of interest on both international and intranational scales, often devoid of rationality. Coexistence between the *status quo* and change proves challenging. An excessive focus on prosperity might undermine priorities in military strength. The pursuit of freedom of action can clash with the objectives of peace and stability. An example is the juxtaposition of U.S. economic interests in Persian Gulf petroleum against moral and emotional investments in Israel since 1948 (Collins, 2002, p. 18).

External competition exerts significant influence on policies and decisions related to employing various instruments of national power, ensuring the protection of both national

interests and competitive positioning (Hill & Watson, 2019, p. 22). While good military outcomes have traditionally been associated with successful campaigns and a robust deterrence capability, recent times have witnessed Western countries grappling with the collapse of the Afghan Government (followed by a chaotic evacuation of those who had supported coalition troops), a full-scale invasion by Russia in Ukraine and a high intensity conflict between Israel and Hamas, Hezbollah, and Iran. When foreign policy experts and military strategists fail to appropriately prioritise national interests, nations face significant strategic repercussions. Without a coherent foundation, security goals, concepts, plans, programmes, and operations lack the stability and coherence necessary for effective implementation (Collins, 2002, p. 18).

Internally, the competition takes place within both the military and government structures. The Armed Services engage in a distinctive and interconnected partnership, relying on each other in joint operations and adapting together to address mutual threats. Nonetheless, they also compete internally for limited resources. This rivalry includes seeking roles and missions that align with the national security goals set by civilian leaders. However, it can lead to the assignment of excessive significance to certain missions and their associated capabilities, often straying from their true utility (Sempere, 2023, p. 88). This assessment may be influenced by risk aversion, particularly in an environment of rivalry, mistrust, and fear among nations, causing an overemphasis on existing threats and the vulnerabilities of current military capabilities, leading to a biased interpretative frame.

For instance, since the conclusion of World War II, a noticeable and persistent trend has emerged in the U.S., with the Services consistently presenting initial budget requests that surpass the budget considered sufficient by the President and Congress, typically by a margin of 25 to 35 % each year. This recurring pattern has prompted some sceptics to make sarcastic remarks, suggesting that a military need is always defined as being 30 % more than the current available resources, regardless of the existing allocation, leading to excessive spending and allocation (Enthoven & Smith, 2005, p. 201).

Overestimation of improbable events is relatively common, and decisions can be framed in various ways, resulting in different preferences (Kahneman, & Tversky, 1979, p. 281). Therefore, there is a tendency to support the accumulation of defence capabilities, as frequently expressed by military personnel seeking additional resources to ensure successful mission execution, rather than risking the perception of failure. From a rational standpoint, this behaviour aims to achieve greater flexibility and manoeuvring margin, in an

environment where the effectiveness of military capabilities is uncertain, governments may authorize the development of redundant and overlapping systems. On the other hand, in democracies, there exists a significant public sentiment that prioritises social welfare and economic stability over military spending, leading to scepticism regarding the necessity of large defence budgets (Lopes da Silva, 2023, p. 577). This complex interplay highlights the challenge of ensuring national security while remaining responsive to the fiscal and social demands of a democratic electorate.

As an example, the United Kingdom (UK) House of Commons Defence Committee (2022, p. 5) points out that "it is difficult not to feel a sense of *déjà vu* as we witness British military ambitions which are not entirely matched by resources." With open conflicts resurfacing in Europe, the Committee expressed disappointment at the Government's inadequate preparation for the potential impact of inflation and insufficient industrial capacity on the production of defence equipment while addressing the emerging challenges.

Competitive dynamics persist regardless of the prevailing circumstances, occurring during both times of peace and war (Hill & Watson, 2019, p. 15). In an organisation, the sub-units seldom cooperate seamlessly to achieve overarching goals. Internal competition is a constant factor that influences decisions on how resources are allocated and affects power dynamics, access, control, and influence within the organisation (Hill & Watson, 2019, p. 22).

1.2 Problem statement

In an ever-changing global context, governments face the challenge of balancing defence expenditures with competing national priorities. While some situations call for increased military spending, others may warrant a more prudent approach that emphasizes non-coercive power (Wolfers, 1952, p. 502). This complexity, coupled with the need to address technological advancements and evolving security threats, complicates decisions on the optimal defence budget. Furthermore, defence organisations must operate in a competitive environment, where agility and innovation are critical to success. However, issues such as interservice rivalry, perceptions of incompetence within Ministries of Defence (MoDs), and political and bureaucratic inefficiencies (Elliott, 2015, p. 81) create additional challenges. The central problem lies in identifying effective strategies and frameworks that allow defence organisations to allocate resources efficiently while adapting to modern technological and security demands.

1.2.1 The core challenge of defence competitiveness

National leaders, advised by trusted aides, must balance national security objectives with other priorities such as economic stability, fiscal policy, and social welfare (Collins, 2002, p. 35). This challenge is compounded by fluctuating public opinion, which can shift from over-reliance on diplomacy to excessive faith in military force (Wolfers, 1952, p. 502). Defence planning, therefore, becomes an exercise in managing uncertainty, as threats evolve and adversaries' capabilities shift.

Military planners spend considerable time analysing scenarios that seem unlikely to most decision-makers and the public, often struggling to secure acceptance for their insights (Ochmanek et al., 2023, p. vi). This difficulty, combined with limited resources and conflicting national priorities, complicates the task of determining the right defence posture. Strategic decisions on resource allocation must balance the need for military preparedness with other pressing domestic needs (Liotta & Lloyd, 2005, p. 125).

The dilemma faced by decision-makers, as noted by Kennedy (1988, p. 539), is that focusing too heavily on military security can strain the economy, whereas insufficient investment leaves national interests vulnerable. Civilian oversight of military matters is necessary, but the balance between military expertise and political leadership is difficult to achieve, as illustrated by Clemenceau's and Eisenhower's opposing views on war (Enthoven & Smith, 2005, p. 116).

Defence planning involves difficult trade-offs, requiring both military and political leaders to carefully evaluate program outcomes in the context of national priorities. Despite the complexities, accountability and strategic vision are essential for aligning defence capabilities with long-term national interests (House of Commons Defence Committee, 2022, p. 37). Without effective frameworks for decision-making, nations risk misallocating resources, undermining both their security and their broader societal needs.

The main challenges to defence planning are presented next.

1.2.2 Unresolvable uncertainty in defence planning

The primary challenge in defence planning is unresolvable uncertainty. While anticipated conflicts may be deferred or never materialize, unforeseen ones often emerge unexpectedly, catching planners off guard (Keupp, 2021, p. 68). This challenge includes the unpredictability of "black swan" events—rare, high-impact occurrences considered unimaginable. Even for foreseeable scenarios, their timing, nature, and likelihood remain largely unpredictable (Bekkers & Spiegeleire, 2010, p. 433).

Uncertainty also surrounds when armed forces will need to be mobilized—whether immediately or after an extended period—and how long such engagements will last. Extended periods of inactivity may reduce the perceived urgency for constant operational readiness (Elliott, 2015, p. 29; Keupp, 2021, p. 68). Furthermore, the dynamic nature of strategic competition complicates defence planning, as evolving global systems and adversary actions continuously defy stable risk assessments (Hill & Watson, 2019, p. 17). For example, the collapse of the Eastern Bloc followed by the resurgence of geopolitical tensions post-2014 highlights how sudden global shifts can invalidate prior military strategies (Keupp, 2021, p. 78).

This unpredictability often leads to resource mismanagement. Overestimating threats can result in excessive procurement, such as the case of the U.S. Navy's Zumwalt-class destroyers, where cost overruns reduced the planned fleet from 28 ships to just three (Keupp, 2021, p. 76). Similarly, Austria's misjudged Eurofighter Typhoon purchase, based on inaccurate cost projections, led to the aircraft's early retirement (Keupp, 2021, p. 76). These procurement challenges arise from incomplete knowledge about future costs, emerging technologies, and supplier strategies.

War further exacerbates uncertainty, as both sides seek to obscure their true capabilities and intentions Strategic decisions must balance immediate threats with broader security concerns, making it difficult to determine the necessary force size or resources for even in the most limited tactical situations (Keupp, 2021, p. 72). While states could theoretically focus on a single existential threat through total war, in practice, they face diverse interests and potential dangers. Engaging in conflict with one adversary may expose vulnerabilities to others. Thus, the "culminating point of victory" isn't merely about balancing bloodshed and resources against the "value of the object" but also about considering how prolonged conflict can undermine broader security interests (Rovner, 2024, p. 3).[1]

War, as an inherently violent and unpredictable force, distorts reason, knowledge, and truth, making it nearly impossible to foresee outcomes (Levinas, 1980, pp. 9–10). The trajectory of war remains uncertain due to the continuous competition between adversaries, each striving to achieve their objectives (Strachan, 2013, p. 23).

[1] Clausewitzian concepts: *the value of the object* is a neat description of what the state is fighting for (Clausewitz, 1989, p. 92); *the culminating point* of victory is about how long and hard the state should fight to achieve it (Clausewitz, 1989, pp. 566-577).

Moreover, rapid technological advancements compound the challenge, as military planners often fail to recognize the potential of emerging technologies. For instance, the British initially underutilized tanks during World War I, missing an opportunity for innovation (Pierce, 2004, pp. 27, 32–34). Today, breakthroughs in artificial intelligence (AI), hypersonic weapons, and quantum computing are reshaping military capabilities, but their full impact remains uncertain (Future of Defense Task Force, 2020, p. 27; NATO [North Atlantic Treaty Organization] Science & Technology Organization [STO], 2020, March, p. 39).

In a fast-moving and complex world, uncertainty also extends to markets, governance, and social values, all of which influence organisations' abilities to achieve their objectives (Berkhout & Hertin, 2002, p. 38). The significance of uncertainty and unpredictability in defence planning is amplified in an era where the potential for conflicts is greater than ever (Telo, Borges, & Pires, 2018, p. 190). Defence organisations must grapple with this uncertainty when planning future capabilities and force structures.

Information about threats depends on intelligence reports, which are often incomplete or inaccurate, resulting in imprecise or distorted views of the adversary. Biases in intelligence estimates—whether optimistic or pessimistic—can skew reality, leading to blind spots (Collins, 2002, p. 26). Approaches seeking consensus in intelligence production can mask genuine disagreements, further distorting assessments (Collins, 2002, p. 28). Historical examples, such as the U.S. overestimation of Soviet missile and bombers capabilities in the 1950s (Haines & Leggett, 2007), or the UK's miscalculations in Iraq and Afghanistan due to insufficient local intelligence, underscore the enduring nature of these challenges (Elliott, 2015, pp. 157–158). More recently, Russia's underestimation of Ukrainian resistance in 2022 serves as a contemporary example of misjudged intelligence.

These errors are not isolated incidents. Decision-makers frequently fail to recognize the military potential of emerging technologies and the unique advantages they offer (Keupp, 2021, p. 74). Rapid advancements in data, AI, space, hypersonic technology, quantum computing, and biotechnology are transforming both society and weaponry at unprecedented speeds (Future of Defense Task Force, 2020, pp. 5, 13; NATO STO, 2020, March, p. vii). New technologies often have latent potential, with their full impact felt only when creatively exploited. Conversely, some scientific breakthroughs can directly lead to significant disruptions (Bartolomeu & Água, 2022, p. 258). The way disruptive technologies are adopted by different groups further affects their impact (Boucher et al., 2020, p. 1).

One notable example is the British introduction of tanks in World War I. Despite their innovative potential, British leaders resisted pursuing armour's potential, unlike the Germans, who learned from British experience and developed the *Panzer* force to exploit armoured warfare effectively (Pierce, 2004, pp. 27, 32–34, 36). Today, NATO faces similar challenges as it no longer holds exclusive control over key military technologies, such as near-real-time sensing, high-capacity communication links, precision guidance using miniaturized electronics, and advanced software (Ochmanek et al., 2023, p. viii).

Uncertainty in defence planning is further exacerbated by the adaptive behaviour of competitors. Even with complete and correct information, predicting outcomes in a confrontation is challenging due to changing conditions and adaptive behaviour (Hill & Watson, 2019, p. 19). Simplified methods using computer models can produce unreliable or biased outcomes, and defence competition lacks fixed rules, boundaries, or clear outcomes. Human factors—personalities, experiences, and social backgrounds—add complexity to risk interpretation (Collins, 2002, p. 7).

Finally, the interdependence among capabilities complicates comparisons and evaluations. Changing geopolitical contexts, defence policies, tactics, and technologies continually alter the evaluation of capabilities (Sempere, 2023, p. 88). Furthermore, the diversity and nature of military services often create difficulties in resource allocation and coherence within the defence sector, as seen with the Army's less costly equipment often being deprioritised (Elliott, 2015, pp. 67-68).

In conclusion, unresolvable uncertainty implies that no amount of additional resources—whether financial or temporal—can fully address the strategic and analytical challenges posed by complex adaptive systems (Hill & Watson, 2019, p. 20).

These challenges are systematically categorised in table 1, which illustrates the interconnected and evolving nature of modern defence issues that resist straightforward solutions.

Table 1 – Principal issues of unresolvable uncertainty in defence planning

Category	Description	References
Unpredictable nature of conflicts	- Rare, high-impact "Black Swan" events. - Foreseeable scenarios remain unpredictable in timing, nature, and likelihood. - Evolving global systems challenge risk assessments.	Bekkers & Spiegeleire, 2010, p. 433; Hill & Watson, 2019, p. 17; Keupp, 2021, p. 68; Taleb, 2012.
Operational and mobilization uncertainty	- Difficulty predicting timing and duration of engagements. - Inactivity reduces perceived urgency for readiness.	Elliott, 2015, p. 29; Keupp, 2021, p. 68.

Impact of geopolitical shifts	- Strategic disruptions due to sudden global events (e.g., collapse of Eastern Bloc, post-2014 tensions).	Keupp, 2021, pp. 68, 78.
Resource mismanagement	- Overestimated threats leading to excessive procurement. - Misjudged financial costs of projects (e.g., U.S. Navy Zumwalt-class destroyers, Austria's Eurofighter Typhoon).	Keupp, 2021, p. 76
Fog of war	- Deliberate obfuscation of capabilities and intentions by adversaries. - Balancing immediate and broader security risks is complex.	Keupp, 2021, pp. 72, 74; Rovner, 2024, p. 3.
Rapid technological advancements	- Missed opportunities in adopting new technologies (e.g., British tanks in WWI). - Unpredictable impacts of AI, hypersonics, quantum computing, and biotechnology.	Future of Defense Task Force, 2020, pp. 5, 13; NATO STO, 2020, March, p. vii; Pierce, 2004, pp. 27, 32–34.
Intelligence limitations	- Incomplete or distorted intelligence reports. - Historical misjudgements in assessing adversary capabilities.	Collins, 2002, pp. 26, 28; Elliott, 2015, pp. 157–158; Haines & Leggett, 2007.
Adaptive behaviour of competitors	- Competitors' evolving tactics make predictions unreliable. - Human factors affect risk interpretation and decision-making.	Collins, 2002, p. 7; Hill & Watson, 2019, pp. 19–20.
Complex interdependencies	- Continuous changes in geopolitics, tactics, and technologies complicate evaluations. - Resource allocation conflicts among diverse military services.	Elliott, 2015, pp. 67–68; Sempere, 2023, p. 88.
Inherent unpredictability of war	- War disrupts reason, knowledge, and truth. - Lack of fixed rules or boundaries in defence competition.	Collins, 2002, p. 7; Levinas, 1980, pp. 9–10; Strachan, 2013, p. 23.
Broader contextual uncertainty	- External factors (markets, governance, social changes) affect objectives. - Amplified conflict potential in modern contexts.	Berkhout & Hertin, 2002, p. 38; Telo, Borges, & Pires, 2018, p. 190.
Limits of resources and models	- No amount of resources can fully resolve unpredictability. - Simplistic models often fail in dynamic defence contexts.	Hill & Watson, 2019, p. 20.

To address these pressing issues, this research proposes an adaptive and competitive strategic framework designed to enhance operational responsiveness and decision-making under conditions of uncertainty.

1.2.3 Structural and institutional barriers to effective defence planning

In a competitive and volatile global security environment, contemporary defence organisations face multifaceted structural and institutional barriers that hinder the development and execution of coherent, future-ready defence strategies. These obstacles stem not only from operational complexity but also from deeper systemic dysfunctions embedded in governance structures, organisational cultures, and civil-military relations. The

resulting inefficiencies constrain strategic foresight, distort resource allocation, and impede institutional learning.

Modern defence organisations operate within multifaceted political and economic contexts, where they must balance the imperatives of military preparedness, economic sustainability, and social welfare. This delicate equilibrium is often disrupted by enduring issues such as inter-service rivalries, bureaucratic inefficiencies within MoDs, and political constraints on long-term planning (Deveraux, 2023, pp. 82–83; Elliott, 2015, p. 81; Hill & Watson, 2019, p. 21; Kennedy, 1988, p. 539; Liotta & Lloyd, 2005, p. 125; Wolfers, 1952, p. 502). Defence planners frequently encounter resistance when advocating for long-term strategies—especially those addressing low-probability, high-impact contingencies (Ochmanek et al., 2023, p. vi).

A critical source of friction in defence planning arises from diverging priorities and time perceptions among key actors. Military leaders generally advocate for early policy decisions to maximise planning time, whereas political leaders tend to postpone commitments to preserve strategic flexibility (NATO STO, 2024, May, p. 2-35). These temporal asymmetries are further exacerbated by institutional silos, which obstruct interdepartmental cooperation.

Despite an awareness of the need for integrated planning, the competition for budgetary resources incentivises military chiefs to prioritise their respective service's growth, sometimes at the expense of collective efficiency (Elliott, 2015, p. 56; Enthoven & Smith, 2005, p. 202). These dynamics preserve legacy structures, even when more cost-effective or innovative alternatives exist. As Schlueter et al. (2025, p. 24) argue, this tendency inhibits doctrinal reform and the institutionalisation of lessons learned from recent conflicts.

Historical and contemporary cases illustrate the consequences of such dysfunctions. Examples include the US Army's resistance to relinquishing cavalry units in 1940, the Air Force's initial rejection of unmanned aerial vehicles (Collins, 2002, p. 25), and the UK's inter-service competition during operations in Iraq and Afghanistan (Elliott, 2015, p. 82). Operational disconnects—such as those seen in Operation Desert Storm, where incompatible information systems hampered coordination (Forster, 2012, pp. 11–12)—continue to illustrate the costs of fragmented planning.

Defence organisations also struggle with persistent structural and strategic inefficiencies that inhibit innovation, modernisation, and effective investment. Key issues

include an overemphasis on bespoke, high-end systems that escalate procurement costs at the expense of scalable, cost-efficient alternatives (Schlueter et al., 2025, p. 9); misaligned capability assessments leading to redundant acquisitions (p. 15); and underutilisation of emerging technologies, particularly AI, due to institutional knowledge gaps and inadequate infrastructure (p. 18). Moreover, defence institutions remain disconnected from shifts in the industrial base, often failing to collaborate effectively with non-traditional technology providers (p. 22). These problems are compounded by deeper systemic barriers, including skill shortages, dysfunctional acquisition frameworks, excessive risk aversion, and misaligned funding mechanisms (p. 28).

Tensions between civilian oversight and military command remain a central structural barrier. While democratic accountability necessitates robust civilian control, misalignments between political and military perspectives often delay or distort critical strategic decisions (Enthoven & Smith, 2005, p. 116; Elliott, 2015, pp. 49–50). Civil servants prioritise fiscal discipline and policy continuity, while military officers focus on operational imperatives—resulting in contested procurement priorities and bureaucratic deadlock (Moore & Trout, 1978, pp. 455–462; Feaver & Kohn, 2021, pp. 15–16).

The "Praetorian Problem" underscores the risks of excessive military influence or politicisation. While Huntington (1967, pp. 8–20) highlights the benefits of apolitical military professionalism, Finer (2002, pp. 25, 88, 89, 205, 208) documents numerous instances in which professionalised armed forces exerted undue influence on political affairs. These tensions remain salient in both fragile democracies and liberal states where military resources may be co-opted for political gain (Bland, 1999, pp. 12–13).

Institutional loyalty and self-interest within MoDs further distort decision-making. According to Downs (1966, p. 27), civil servants' allegiance to their organisation—linked to personal career advancement—can foster sub-goal pursuit and opportunism. This often results in the concealment of critical information or the adoption of suboptimal solutions to maintain bureaucratic stability.

Political actors, driven by short-term electoral cycles, may allocate defence resources based on political expediency rather than strategic necessity. "Pork-barrelling" and localised defence investments reflect this misalignment, with decisions shaped more by constituency interests than national security priorities (Fernandez & Rodrik, 1991, p. 1154; Sempere, 2023, p. 100).

Cultural and institutional differences between defence organisations, civilian agencies, and private-sector partners further hinder collaboration. The absence of a shared strategic language and common operational norms leads to misunderstandings and inefficiencies, especially in development cooperation and industry partnerships (NATO STO, 2024, May, p. 2-36). A significant knowledge gap also persists between political decision-makers and military professionals, with each group often lacking insight into the constraints and operational realities of the other. This disconnection extends to the broader public, where limited understanding of defence institutions affects societal support for security investments and long-term preparedness (NATO STO, 2024, May, p. 2-36).

Flawed defence planning and resource misallocations have consistently produced severe consequences. Portugal's unprepared deployments in Africa during World War I (Barroso, 2018; Martins, 2019, pp. 185-189; Telo & Pires, 2018, pp. 57–58, 284–287), the U.S.' strategic misjudgements in Vietnam, and the Soviet Union's failed campaign in Afghanistan (Braithwaite, 2011; Sempere, 2023, p. 98) illustrate the strategic costs of institutional dysfunction. More recent examples, such as the UK's troubled aircraft carrier programme (House of Commons Defence Committee, 2015, p. 3) and Portugal's helicopter procurement failure (Gil, 2014), reveal how flawed processes can compromise military readiness and public trust.

As noted by Keupp (2021, p. 44) and Wolf (1978, p. 19), institutional inefficiencies often persist until exposed by battlefield failures or procurement scandals.

The implications of these barriers are particularly evident in procurement processes, where military commanders frequently prioritise operational effectiveness over cost-efficiency. Once contracts are awarded to private firms, the armed forces often lose influence over fixed costs while remaining responsible for maximising performance to ensure mission success (Keupp, 2021, pp. 59-60). This divergence in institutional priorities can result in critical capability gaps, jeopardising operational readiness and endangering lives on the battlefield.

Another prevalent issue arises from subordinates who tend to deliver information that aligns with, rather than challenges, their superior's perspective. This behaviour is often driven by a desire to avoid raising doubts about their loyalty or worth, resulting in a significant distortion of information (Downs, 1966, p. 78; Elliott, 2015, p. 59). The inherent problem lies in the fact that decision-making authorities can make misguided judgments when they lack accurate information, and their subordinates lack motivation to provide such

information. This situation needs costly audits and verifications to ensure the availability of reliable data.

The decision-making environment within defence institutions is often characterized by informal discussions and negotiations, where substantial expertise is utilized to justify decisions that have already been made, rather than to conduct thorough analyses of options and potential outcomes (Elliott, 2015, p. 80). This approach undermines the integrity of the decision-making process, as essential insights are sidelined in favour of maintaining the *status quo* or appeasing political considerations.

Overall, these persistent challenges reflect both visible and latent forms of institutional inertia. The widening gap in defence innovation readiness is driven not only by tangible constraints—such as outdated systems and human capital deficits—but also by strategic misalignments, failure to absorb past lessons, and insufficient integration of cutting-edge technologies (Schlueter et al., 2025, pp. 1, 7). Without rigorous, forward-looking planning and accountable decision-making, defence institutions risk the misallocation of resources, thereby undermining national security and societal resilience (House of Commons Defence Committee, 2022, p. 37).

Table 2 synthesises these challenges, providing a conceptual foundation for the analysis that follows.

Table 2 – Structural and institutional barriers to effective defence planning

Category	Description	References
Interservice competition	- Persistent competition among military branches fosters fragmented strategies and organisational friction. - Rivalry often obstructs integration, innovation, and efficient planning—especially in joint operations. - Operational examples, such as Operation Desert Storm, reveal enduring challenges in coordination, targeting, and command dissemination.	Collins, 2002, p. 25; Cozad et al., 2023, p. 75; Deveraux, 2023, pp. 82-83; Elliott, 2015, pp. 56, 72–74, 82; Enthoven & Smith, 2005, p. 202; Forster, 2012, p. 12; Schaefer et al., 2020, pp. 36–37.
Organisational challenges	- Institutional behaviours—such as careerism, rent-seeking, path dependency, and resistance to reform—undermine innovation and collaboration. - Defence institutions exhibit persistent structural inefficiencies that inhibit learning and adaptation. Contributing factors include: o Skill shortages. o Dysfunctional acquisition frameworks. o Excessive risk aversion. o Inadequate integration of lessons from recent operations.	Cozad et al., 2023, p. 186; Downs, 1966, p. 27; Elliott, 2015, pp. 56, 72-74; Lyle, 2019, August 5, p. 7; Schlueter et al., 2025, pp. 1, 7, 24, 28.
Governance challenges	- Defence governance is marked by political-military tensions, with diverging visions and timelines for action.	Cozad et al., 2023, p. 187; Elliott, 2015, pp. 49-50, 81, 235; Enthoven & Smith, 2005,

	- Politicians often delay decisions to preserve flexibility, while military actors seek timely commitments for effective planning. - Civilian oversight is essential, but difficult to balance with operational autonomy. - Political interference in budgeting and capability planning—e.g., pork-barrelling—leads to inefficiencies and strategic misalignments.	p. 116; Feaver & Kohn, 2021, pp. 15-16; Fernandez & Rodrik, 1991, p. 1154; Kennedy, 1988, p. 539; Moore & Trout, 1978, pp. 455-462; NATO STO, 2024, May, p. 2-35; Sempere, 2023, p. 100; Sundqvist & Bynander, 2021, p. 41.
The "Praetorian Problem"	- Disproportionate military influence in state governance weakens democratic oversight. Risks include: o Authoritarian drift. o Politicisation of the officer corps. o Reduced transparency and accountability. - Historical cases illustrate how blurred boundaries between political and military leadership undermine civil-military relations.	Bland, 1999, pp. 12–13; Finer, 2002, pp. 25, 88, 89, 205, 208; Huntington, 1967, pp. 8–20.
Procurement inefficiencies	- Overinvestment in bespoke, high-end systems inflates costs and reduces flexibility. - Misaligned capability assessments result in redundant or ineffective acquisitions. - Underutilisation of emerging technologies—especially AI—is driven by: o Institutional knowledge gaps. o Risk aversion. o Inadequate digital infrastructure. - Defence institutions often fail to adapt to changes in the industrial base, impeding collaboration with non-traditional technology providers.	Keupp, 2021, pp. 44, 59–60; NATO STO, 2024, May, p. 2-35; Schlueter et al., 2025, pp. 7, 9, 15, 18, 22, 28; Wolf, 1978, p. 19.
Decision-making challenges	- Strategic decisions are often driven by bureaucratic incentives or preordained political preferences rather than rigorous analysis. - Subordinates may distort communication by aligning analysis with leadership expectations. - Planning misalignments and cultural barriers across agencies reduce institutional agility and responsiveness under uncertainty.	Downs, 1966, p. 78; Elliott, 2015, pp. 59, 80; NATO STO, 2024, May, p. 2-36.
Cultural and knowledge gaps	- Divergences in institutional cultures, values, and operational vocabularies hinder inter-agency cooperation. - Public misunderstanding of military structures undermines societal support for defence initiatives. - Insufficient mutual understanding between military and civilian leaders disrupts strategic coherence.	Defense Innovation Board, 2024, July 5, p. 4; Egnell, 2013, pp. 240-241; NATO STO, 2024, May, p. 2-36; Sundqvist & Bynander, 2021, p. 41.

This study further explores strategic pathways for overcoming these barriers.

1.2.4 Personal ambition, bias, rent-seeking, and corruption in defence institutions: behavioural drivers and organisational consequences

Personal ambition, bias, rent seeking, and corruption significantly contribute to inefficiencies and dysfunctions within military organisations. These issues not only impede organisational effectiveness but also undermine the integrity of defence procurement and

decision-making processes. Despite their relevance, the heuristics and biases employed by military elites remain underexplored, necessitating individual-level analysis to elucidate these behavioural patterns (Kenwick, 2020, p. 13).

Individual ambition can drive both positive and negative outcomes in military contexts. As Clausewitz (1989, p. 105) notes, the thirst for fame, honour, and personal interest fuels the energy, creativity, and competitive enthusiasm of military leaders, which are vital in making an army victorious. Nevertheless, ambition can also erode unit cohesion. This drive manifests itself in the pursuit of higher ranks and the competition for prestigious leadership positions, where intense rivalry is common. While some individuals may accept lateral career movements, the majority experience a pervasive fear of not being selected, significantly influencing their decisions and behaviours. As Elliott (2015, p. 58) observes, this fear can provoke retaliatory actions, such as a refusal to cooperate or a rigid, overly meticulous approach, when individuals feel overlooked. Moreover, excessive personal ambition is frequently perceived negatively by colleagues, fostering behaviours where officers display contrasting attitudes—appearing friendly and accommodating toward superiors while remaining reserved or critical toward subordinates (Elliott, 2015, p. 56). Consequently, while ambition can be a driving force for success, it also poses risks to the integrity of team dynamics within the military.

Resistance to institutional change is also driven by personal interest. Many military personnel act to preserve their roles, even when recognising the need for reform. Keupp (2021, pp. 80–81) links this to an attachment to *status* and the *status quo*, particularly within bureaucracies where individuals value power and prestige over performance. Such attitudes hinder adaptability and reinforce dysfunctional organisational norms.

Cognitive and institutional biases further distort defence decision-making. Elliott (2015, p. 38) observes that biases—frequently unconscious—influence how politicians, officers, and civil servants assess risk and allocate resources. Administrative decisions often favour adequacy over efficiency, neglecting opportunity costs and trade-offs (Simon, 1997, pp. 290–291). Subjective judgements, influenced by alignment with institutional values, undermine objective policy outcomes.

Cognitive biases in military decision-making, such as groupthink and deference to authority without subject matter expertise, often lead to distorted assessments (Elliott, 2015, pp. 79, 163; Peco-Yeste, 2024, p. 13). In hierarchical environments where dissent is discouraged, these biases reinforce outdated practices and suppress innovation (Moore &

Trout, 1978, p. 467; Strik, 2023, pp. 17–18, 64). Moreover, the coexistence of formal and informal institutional processes creates parallel structures that undermine organisational coherence and efficiency (Keupp, 2021, p. 112).

Information manipulation is another behavioural challenge. Officers and officials may tailor arguments to meet superiors' expectations or obscure programme costs until irreversible investments are made (Elliott, 2015, pp. 75, 79). Sempere (2023, p. 94) and Hammond, Keeney, and Raiffa (1998) describe this as the "sunk-cost trap," wherein continued investment in failing projects is rationalised to avoid reputational damage.

Rent-seeking remains a structural vulnerability in defence procurement systems. In contexts shaped by planned economic legacies or budget-maximising institutional cultures, resource misallocation and inflated costs are prevalent (Keupp, 2021, p. 104). Civilian contractors and defence manufacturers frequently exploit information asymmetries to influence procurement decisions (Keupp, 2021, pp. 104–105), a pattern exacerbated by procurement officers' limited incentives, time, and informational resources to consider alternative solutions (Keupp, 2021, p. 46). Fragmented organisational responsibilities—separating ownership, purchasing, and operational use—further enable rent-seeking behaviours, as actors manipulate demand specifications and circumvent market competition (Aligica & Tarko, 2014, pp. 159–160). In addition, excessive reliance on military expertise and overlapping institutional mandates create conditions for strategic information asymmetry and what Reykers and Fonck (2020, p. 80) describe as "agent intrusion," where internal actors manipulate procurement outcomes to serve particularistic interests at the expense of competitive integrity.

Even with formal bidding, supplier collusion can sustain inflated costs. This behaviour diverts resources from operational priorities, undermining both efficiency and military effectiveness (Keupp, 2021, pp. 46–47). The U.S. Armed Forces, for instance, deals with thousands of suppliers yet struggles with oversight, contract management, and fraud detection (Minow, 2005, p. 1001). Procurement of full systems rather than prototypes transfers technical and financial risk to the military, often leading to litigation. For example, Austria sued Airbus in 2017 for €1.1 billion due to unforeseen operating costs, while Germany's case in 2016 against Heckler & Koch over G-36 rifle defects failed (Keupp, 2021, p. 54).

A central root cause behind these failures lies in the structural misfit between proposed reforms and existing institutional arrangements. When reforms are introduced without

adequate legal grounding or are poorly aligned with organisational realities, they tend to provoke uncertainty and internal resistance, ultimately disrupting programme continuity (Weiss, 2019). Further compounding these risks are technological and contractual constraints, particularly in indigenous projects where domestic capabilities may be insufficient to meet operational demands and where complex contractual arrangements with external suppliers can generate friction (Kundu, 2019).

Corruption and state capture significantly weaken procurement ecosystems, with certain market segments becoming particularly prone to illicit practices. These conditions elevate the risk of both operational failure and prolonged legal disputes (Czibik et al., 2021; Mik, 2024, pp. 71–72).

Corruption remains a deeply embedded issue, defined as the abuse of entrusted power for private gain. It manifests as grand, petty, or political corruption and is exacerbated by the opaque, complex, and high-stakes nature of defence procurement (Transparency International Defence & Security, 2021, p. 119; Mara & Narvekar, 2022). Global trends point to weakening rule of law and impunity for corruption, particularly where judicial independence and law enforcement capacity are insufficient. The Corruption Perceptions Index indicates that only 28 out of 180 countries have improved over the past decade, while 34 have deteriorated due to justice system failings (Transparency International, 2024, pp. 4–5).

Grand corruption frequently takes the form of clientelism, in which political elites allocate public resources—such as procurement contracts or civil service appointments—in return for political loyalty (Dávid-Barrett & Fazekas, 2020, pp. 411–412). In more extreme cases, this leads to state capture, where oligarchic networks subordinate public institutions to private interests.

Balancing secrecy for national security with the need for oversight is a central governance dilemma. High-value procurement attracts undue influence (Mara & Narvekar, 2022). In Belgium, bribery allegations against the manufacturers Agusta and Dassault in the 1990s triggered parliamentary reforms (Reykers & Fonck, 2020, p. 73). In Canada, cost disputes over the Joint Strike Fighter led to a vote of no confidence and delayed acquisition (Reykers, 2021, p. 505). Across jurisdictions, defence procurement laws often deviate from transparency norms, granting wide discretionary powers to contracting authorities. This opacity, as noted by the Support for Improvement in Governance and Management (SIGMA) (2011, p. 3), creates fertile ground for protectionism and misallocation of public resources.

The consequences of corruption extend beyond inefficiency. It compromises national security, perpetuates inequality by diverting funds from essential services, and destabilises societies (Kallany, 2022, p. 2). The global arms trade is deeply implicated, with nearly half of all imports directed to countries at high corruption risk (Transparency International Defence & Security, 2021, p. 8). This fuels conflict, undermines human rights, and exacerbates instability in fragile states.

By synthesising these challenges, table 3 lays the groundwork for the ensuing examination.

Table 3 – Behavioural and institutional drivers of dysfunction in defence decision-making

Category	Description	References
Personal ambition and rivalry	- Individual ambition can foster innovation and leadership but also erodes cohesion through rivalry and fear of exclusion. - Officers may behave strategically—courting superiors while marginalising subordinates—to secure promotions. - Resistance to reform often reflects efforts to protect roles and prestige, even when recognising inefficiencies.	Clausewitz, 1989, p. 105; Elliott, 2015, pp. 56, 58; Keupp, 2021, pp. 80–81; Frain & Jans, 2024.
Cognitive and institutional biases	- Heuristics and biases shape assessments of risk, resources, and performance, often unconsciously. - Groupthink and deference to authority without expertise distort decisions, especially in hierarchical environments that discourage dissent. - Subjective preferences and institutional alignment influence choices, undermining objectivity	Elliott, 2015, pp. 38, 79, 163; Keupp, 2021, p. 112; Moore & Trout, 1978, p. 467; Peco-Yeste, 2024, p. 13; Simon, 1997, pp. 290-291; Strik, 2023, pp. 17–18, 64.
Information manipulation	- Officers may distort or withhold information to align with leadership preferences or ensure programme continuity. - The "sunk-cost trap" reinforces commitment to failing projects to avoid reputational damage. - Such manipulation reduces transparency and impairs effective oversight.	Elliott, 2015, pp. 75, 79; Hammond, Keeney & Raiffa, 1998; Sempere, 2023, p. 94.
Rent-seeking in procurement	- Fragmented responsibilities in procurement (ownership, purchasing, use) allow actors to bypass market competition. - Internal stakeholders manipulate procurement outcomes to serve particularistic interests. - Demand inflation, collusion, and poor incentives for procurement officers increase costs and reduce efficiency. - Systemic failures persist across large procurement networks (e.g., US, Austria, Germany), often resulting in litigation over project failures. - Structural misalignment undermines reform. - Technological and contractual constraints add complexity. - Corruption and State capture erode procurement integrity.	Aligica & Tarko, 2014, pp. 159-160; Czibik et al., 2021; Keupp, 2021, pp. 46-47, 54, 104-105; Kundu, 2019; Minow, 2005, p. 1001; Mik, 2024, pp. 71–72; Reykers & Fonck, 2020, p. 80; Weiss, 2019.
Corruption and opacity	- Corruption—grand, petty, or political—is widespread in opaque, high-stakes defence environments. - Weak oversight, discretion in procurement, and limited judicial capacity foster impunity. - Cases from Belgium, Canada, and Austria highlight legal and political consequences. - Corruption undermines trust, reallocates resources away from critical needs, and exacerbates conflict in fragile states.	Transparency International, 2024, pp. 4–5; Dávid-Barrett & Fazekas, 2020, pp. 411–412; Kallany, 2022, p. 2; Mara & Narvekar, 2022; Reykers, 2021, pp. 505–506; SIGMA, 2011, p. 3; Transparency

		International Defence & Security, 2021, pp. 8, 119.

1.2.5 Additional challenges outside the scope of this study

In addition to the core challenges examined in this thesis, two further obstacles warrant acknowledgement for their substantial implications for defence governance and strategic coherence. Although not subjected to detailed analysis here, they remain integral to the broader defence planning environment: (1) expertise gaps among defence planners and decision-makers, and (2) persistent difficulties in the recruitment and retention of military personnel.

Expertise gaps affect both civilian and military leadership and contribute to suboptimal strategic planning, limited oversight, and reactive policy-making (Cozad et al., 2023, p. 187; Mukherjee & Pion-Berlin, 2022, p. 794; Elliott, 2015, p. 44). The absence of specialised knowledge within MoDs, parliaments, and executive agencies often hampers long-term planning and weakens the intellectual foundations of national security strategies (House of Commons Defence Committee, 2015, p. 4; Gil, 2014).

In parallel, the recruitment and retention crisis has emerged as a critical concern across NATO and European armed forces. Converging demographic, institutional, and socio-cultural factors have eroded the ability of defence organisations to sustain adequate personnel levels, thereby diminishing readiness and strategic depth (Besch & Westgaard, 2024, p. 1; European Organisation of Military Associations and Trade Unions [EUROMIL], n.d.; Gomes, Ramalho, & Martins, 2024, p. 2; Gil, 2014; House of Commons Defence Committee, 2022, p. 32; Vergun, 2023). These challenges are further compounded by waning public interest in military careers and increased competition from the civilian labour market.

While both issues constitute serious impediments to the effective functioning of defence institutions, they lie outside the analytical scope of this thesis, which focuses on uncertainty, institutional and behavioural distortions affecting planning decisions, resource allocations, and governance processes. A comprehensive approach to defence reform, however, would necessitate further investigation into the institutional mechanisms for developing and retaining expertise, as well as the political and organisational factors shaping military human resources (HRs) strategies.

1.3 Justification and significance of the study

1.3.1 Justification of the study

The purpose of this study is to undertake a comprehensive examination of the multifaceted challenges and inefficiencies that characterize defence resource allocation and strategic planning within contemporary military organisations. The study aims to illuminate the critical interplay between military and civilian decision-making processes, exploring how individual motivations, cognitive biases, and institutional dynamics can adversely impact defence strategies and operational outcomes. Defence is a cornerstone of state and human security; however, failures in this domain can have devastating consequences, including international operational failures, military coups, and violent insurgencies that disproportionately affect ordinary citizens (Transparency International Defence & Security, 2021, p. 8).

This study recognizes the urgent need to assess these failures considering recent geopolitical developments, particularly the implications of Russia's 2022 invasion of Ukraine, which has significantly altered the security landscape and challenged existing paradigms of defence planning (Ochmanek et al., 2023, p. iii). By critically engaging with the concept of unresolvable uncertainty, the study aims to uncover the underlying sources of this uncertainty, emphasizing the roles of complexity and adaptive strategies in shaping effective military responses.

A central objective of this research is to explore the cognitive limitations and incomplete knowledge that often hinder effective decision-making in defence contexts. The study analyses how contextual elements—including time constraints, complexity, and the decision-making frameworks employed by planners—contribute to suboptimal resource allocation and strategic misalignments (Sempere, 2023, p. 97). By addressing these factors, the research seeks to promote a more rational and evidence-based approach to military strategy, ultimately enhancing operational effectiveness in an increasingly complex environment.

Moreover, the study investigates the cultural divide between military personnel and civilian decision-makers, aiming to foster improved collaboration and communication in defence planning. It examines how gaps in civilian expertise and oversight can lead to inefficient military operations and resource misallocation, particularly in light of the observed disconnect between political leaders and military officers (Mukherjee & Pion-

Berlin, 2022, p. 794). This exploration is essential for developing a more cohesive and effective defence strategy that aligns military capabilities with national security objectives.

The study also critically assesses the influence of personal motives, biases, and rent-seeking behaviours within defence institutions. By analysing how these factors contribute to inefficiencies in defence procurement and decision-making processes, the research aims to shed light on the broader implications for national security and military effectiveness. Addressing issues such as corruption and systemic inefficiencies will be pivotal for advocating reforms that promote transparency and accountability in defence resource allocation.

By investigating these interrelated issues, the study aims to provide comprehensive insights into the complexities of defence planning and resource allocation. It seeks to contribute to a more effective and accountable defence sector that can handle the challenges posed by the current geopolitical environment. Ultimately, this research aspires to inform policymakers, military leaders, and academic discourse on defence strategy, offering evidence-based recommendations that enhance national security and operational effectiveness in the face of evolving threats.

1.3.2 Significance of the study

The significance of this study lies in its potential to advance both academic knowledge and practical policymaking in defence. At the academic level, it contributes to the literature on strategic military planning by refining and integrating concepts of uncertainty management, institutional reform, and governance integrity into a unified framework of competitive defence. Through an abductive, realist-informed synthesis, the study introduces new theoretical insights into how defence organisations can adapt to unresolvable uncertainty while addressing structural barriers and behavioural dysfunctions such as ambition, bias, and corruption. This synthesis not only enriches existing defence studies but also provides a conceptual foundation for future scholarly inquiry into adaptive and resilient institutions.

From a practical perspective, the research offers actionable strategies for policymakers and defence leaders, equipping them with analytical tools to enhance decision-making, resource allocation, and institutional design. By emphasising adaptability, transparency, and accountability, the study provides a roadmap for strengthening defence institutions in NATO and comparable contexts. Its findings are especially relevant in light of contemporary

geopolitical disruptions, where strategic competition and technological change demand institutions that can both preserve national resilience and maintain a competitive edge.

Ultimately, the study's significance lies in bridging theory and practice: it generates conceptual clarity on competitive defence while offering practical guidance to those responsible for shaping defence policy and governance in an increasingly complex and contested security environment.

1.4 Objectives, research questions, scope, limitations, and delimitations

1.4.1 Study objectives

The primary objective of this PhD thesis is to develop a comprehensive and competitive defence framework that addresses key challenges—unresolvable uncertainty, structural and institutional barriers, personal ambition, bias and corruption—enabling defence organisations to enhance their overall competitiveness and adaptability in a complex global security environment.

To achieve this overarching goal, the study will pursue the following specific objectives:

1) To design adaptive and competitive strategic frameworks for managing unresolvable uncertainty in defence planning, integrating risk management, scenario-based planning, and agile decision-making processes to enhance responsiveness and operational competitiveness.
2) To propose solutions for addressing institutional barriers, aimed at fostering better interservice collaboration and strengthening the integration between military branches and civilian institutions, thereby ensuring a unified, competitive defence strategy.
3) To develop mechanisms that minimize the impact of personal ambition, bias, rent-seeking and corruption within defence procurement and decision-making processes, promoting transparency, accountability, and ethical governance to improve resource allocation.

Collectively, these objectives aim to provide actionable frameworks and strategies that empower defence institutions to adapt and succeed in complex and competitive global security environments.

1.4.2 Research questions

Based on the outlined objectives, the following RQs are designed to guide the investigation and the formulation of practical, competitive defence frameworks:

General RQ:

How can a competitive defence framework be conceptualised and operationalised to equip defence organisations with the capacity to address key operational challenges—uncertainty, governance dysfunctions, bias, and corruption—, while ensuring resilience and adaptability in the face of future challenges?

Specific RQ:

1) What adaptive strategic frameworks can be developed to enhance decision-making under unresolvable uncertainty and ensure effective risk management in defence planning?
2) How can defence organisations overcome structural and institutional barriers to enhance resource allocation and ensure strategic coherence in a complex and evolving security environment?
3) How do ambition, bias, rent-seeking, and corruption continue to shape procurement outcomes across diverse institutional settings, and what lessons can be drawn for improving transparency, accountability, and operational effectiveness?

These RQs will direct the empirical investigation and theoretical exploration in the subsequent chapters.

1.4.3 Scope of the study

The scope of this study is defined by its primary objective: to develop a comprehensive framework for competitive defence that enables organisations to address key challenges of unresolvable uncertainty, structural and institutional barriers, and governance dysfunctions such as personal ambition, bias, and corruption. To achieve this, the analysis focuses on the institutional and strategic levels of defence planning rather than tactical or battlefield operations. Within this level of analysis, particular attention is given to internal processes, including resource management, interservice coordination, leadership dynamics, and governance safeguards, as these domains most directly determine organisational competitiveness and adaptability.

The study is conceptually grounded in a qualitative, abductive, realist-informed approach. Its methodological emphasis lies on conceptual synthesis, structured comparative analysis, and selected empirical illustrations, rather than large-N quantitative generalisations. While acknowledging the relevance of broader societal factors such as

public opinion and macroeconomic constraints, the analysis prioritises defence-sector internal reforms and decision-making processes.

This scope ensures that the research remains adequately focused while retaining comprehensive coverage of the structural and strategic aspects necessary to build an actionable and theoretically robust framework of competitive defence.

1.4.4 Limitations and delimitations of the study

The study is subject to both limitations and delimitations that define the boundaries of its analysis.

One key limitation is restricted access to classified or sensitive defence data, which constrains the ability to fully capture internal deliberations within MoDs or allied institutions. To mitigate this, the research relies on open-source materials, declassified documents, official policy reports, and scholarly literature, complemented by selected empirical illustrations. A second limitation concerns generalisability: by concentrating on NATO member states and partners, the findings are most applicable to democratic states with developed institutional frameworks and may require adaptation in other political or regional contexts. Finally, the pace of geopolitical and technological change imposes temporal limitations, as evolving threats and innovations may alter the applicability of some conclusions over time.

The delimitations of the study are intentional boundaries set by design. Analytically, the research concentrates on three domains: unresolvable uncertainty, structural and institutional barriers, and governance/behavioural dysfunctions. Other relevant issues—such as recruitment and retention, or expertise gaps among planners—are acknowledged but excluded to maintain coherence with the study's objectives. Geographically, the research is delimited to NATO states and partners; temporally, it spans the post–Cold War era to 2025, when defence planning has been reshaped by technological innovation and renewed strategic competition.

These limitations and delimitations clarify the conditions under which the findings should be interpreted. Methodological limitations specific to the abductive, realist-informed design are discussed in detail in subchapter 3.5, ensuring transparency regarding the analytical choices and their implications.

1.5 Definition of key terms

To ensure conceptual clarity and consistency throughout this thesis, the following key terms are defined. These definitions are drawn from established academic, institutional, and

doctrinal sources, but in several cases they are adapted or synthesized to reflect the defence governance and strategy context of this research. Each term is presented with a concise definition followed by its relevance to the study.

Adaptive frameworks – Defence planning and decision-making approaches that emphasize flexibility, iteration, and continuous learning in response to shifting threats and technologies. They integrate mechanisms for sensing change, testing alternative pathways, and adjusting force development accordingly (Walker et al., 2013, pp. 957–959). In the military context, adaptive frameworks allow organisations to remain competitive under conditions of deep uncertainty by balancing preparedness with responsiveness.

Agility – The capacity of defence to rapidly reconfigure strategies, processes, and capabilities in response to evolving threats or opportunities. It extends beyond speed to include resilience, innovation, and adaptability at strategic, operational, and organisational levels (Doz & Kosonen, 2010, p. 371; Weber & Tarba, 2014, p. 6). For this study, agility is a core criterion of competitive defence, requiring modular force structures and dynamic decision-making.

Antifragility – A quality of systems that benefit and grow stronger from volatility, shocks, and uncertainty. Nassim Nicholas Taleb (2012) contrasts antifragility with resilience: while resilience resists shocks and remains the same, antifragile systems improve under stress. In this thesis, antifragility is applied to defence organisations as a desired quality, enabling them not only to withstand crises but to evolve and improve because of them.

Black swan events – Rare, unpredictable, and highly consequential events that lie outside normal expectations. Taleb (2007, pp. xvii–xviii, 153–154) emphasizes that such events defy conventional forecasting and risk management models. In defence, black swans include unforeseen geopolitical shifts, disruptive technologies, or unconventional adversary tactics. Their significance in this thesis lies in challenging traditional defence planning assumptions and strengthening the case for adaptive and resilient strategies.

Civil–military relations – Institutional arrangements and cultural norms that regulate interaction between civilian authorities and the armed forces. Huntington (1957) frames it as the balance between civilian control and military professionalism. In this thesis, the quality of civil–military relations is a determinant of governance resilience: weak or blurred authority lines can produce dysfunction, bias, or praetorian tendencies.

Competitive defence – A coordinated institutional posture that (1) aligns political, informational, economic, and military instruments to preserve strategic advantage; (2) continuously adapts to threats and technological change through modular capability planning and iterative learning; and (3) embeds transparent accountability and anti-capture safeguards to deter corruption, rent-seeking, and factional capture (author's definition, based on synthesis of defence governance and strategy literature).

Competitive strategy – The deliberate positioning of an organisation to leverage its unique strengths and achieve advantage over rivals. In the corporate sense, Porter (1998, p. 47) describes it as maximising the value of capabilities to outperform competitors. In defence, it is defined as "an interrelated series of ideas and actions for employing the instruments of national power in a long-term, synchronized, and integrated fashion to achieve and maintain a position of advantage" (Joint Chiefs of Staff [JCS], 2023, p. 64).

Defence procurement – The process by which authorities acquire goods, services, and infrastructure necessary for armed forces to fulfil their missions. It encompasses planning, contracting, and oversight, with significant implications for efficiency, innovation, and corruption risks (SIGMA, 2011, p. 2). This thesis treats procurement as a central locus of institutional reform to ensure competitive defence.

Fog of war – A concept introduced by Clausewitz in *On War* (1832/1989, pp. 117–118, 139–140), referring to the uncertainty, ambiguity, and friction in combat arising from incomplete and unreliable information. In modern defence, it represents the enduring difficulty of decision-making under imperfect intelligence and rapidly changing conditions. This concept supports the thesis' focus on flexibility and judgment in competitive defence planning.

Governance dysfunctions – Recurrent institutional failures—such as excessive centralisation, unclear accountability, or politicised oversight—that prevent defence organisations from functioning effectively. These dysfunctions enable corruption, bias, and inefficiency. In this thesis, governance dysfunctions are treated as systemic obstacles that adaptive frameworks and external levers must address (Dávid-Barrett & Fazekas, 2020, pp. 411–415).

Innovation – Novel methods and technologies that improve either the products (weapons, systems) or processes (doctrine, operations, logistics) used to achieve military objectives. It can be sustaining (incremental improvements) or disruptive (radically

changing existing practices) (Cheung et al., 2011, p. 8). The thesis emphasises innovation as a driver of competitive advantage and institutional renewal.

Path dependency – The way past decisions and institutional arrangements constrain present and future options. Once a particular procurement model, alliance structure, or governance arrangement is established, it creates self-reinforcing feedback loops that make change difficult (Pierson, 2000, p. 265). In defence, path dependency explains persistent inefficiencies and the difficulty of reform despite evidence of dysfunction.

Resilience – The capacity of defence institutions and societies to absorb shocks, recover from disruptions, and sustain core functions under stress. It combines robustness (withstanding shocks), adaptability (adjusting to change), and redundancy (maintaining backups and alternatives) (Keenan et al., 2024, pp. 506–508). In NATO's framework, resilience is both a strategic imperative and a deterrent capability.

Risk management – The systematic identification, assessment, and mitigation of potential threats to mission objectives and institutional integrity (author's definition, based on synthesis of "risk management in defence" literature). Unlike uncertainty, risks are events or conditions with estimable probability and impact, which allows the application of structured methods such as risk registers, mitigation plans, and scenario testing. Within this thesis, risk management is examined as a complementary tool to adaptive planning in reducing vulnerability to foreseeable challenges.

Scenario-based planning – A structured method for preparing defence strategies under uncertain futures. Rather than attempting precise prediction, it develops multiple plausible future environments (scenarios) against which capabilities and strategies are tested (Godet, 2006, pp. 171, 172, 306, 308; Schoemaker, 1995, p. 25). For defence organisations, scenario planning enables stress-testing of assumptions and identification of robust, flexible options across divergent possible futures.

Strategic competition – A persistent struggle between adversaries with incompatible interests, conducted short of open conflict. It involves sustained use of political, economic, informational, and military instruments to gain advantage (JCS, 2023, pp. 1, 67). For this thesis, strategic competition defines the global context in which defence organisations must adapt and innovate.

Unresolvable uncertainty – Situations in defence planning where future developments cannot be forecast with sufficient precision to enable deterministic planning. Unlike measurable risk, unresolvable uncertainty cannot be eliminated through probabilistic

modelling because it arises from complexity, ambiguity, and structural unpredictability in the strategic environment (Davis, 2003, pp. 132–134; Marchau et al., 2019, p. 2). In this thesis, it underpins the rationale for adaptive and iterative planning frameworks rather than reliance on fixed, long-term predictions.

1.6 Chapter summary and thesis structure overview

1.6.1 Summary of the introduction

This introductory chapter has established the complex and multifaceted nature of challenges confronting modern defence organisations in an increasingly volatile and competitive global environment. It highlighted three core problem areas: unresolvable uncertainty in defence planning, entrenched structural and institutional barriers, and pervasive behavioural dysfunctions including personal ambition, bias, rent-seeking, and corruption. Together, these issues complicate strategic coherence, resource allocation, and operational effectiveness in national defence.

The chapter articulated the justification and significance of the study, emphasizing the urgent need for integrated frameworks that combine adaptive strategic planning, institutional reform, and governance integrity to enhance defence competitiveness. The primary and specific research objectives and questions were detailed, guiding an inquiry into adaptive frameworks, institutional barriers, and governance dysfunctions across diverse contexts. The scope and delimitations clarified the focus on NATO and partner states within a post-Cold War and contemporary technological setting, while acknowledging limitations in access and generalizability.

Key terms were defined to ensure conceptual clarity, grounding the study in interdisciplinary theories of complexity, strategic competition, and institutional behaviour. The chapter laid the groundwork for a systematic and theoretically informed examination of how defence institutions can develop resilience and agility to navigate uncertainty and evolve in response to emerging threats.

1.6.2 Overview of following chapters

The thesis is organised into six chapters, each of which builds upon the previous to develop and substantiate the concept of competitive defence.

Chapter 2 reviews the literature that frames the thesis, focusing on three interconnected domains: unresolvable uncertainty, structural and institutional barriers, and behavioural dysfunctions. It shows how defence planning is challenged not only by unpredictable strategic environments but also by entrenched organisational inefficiencies and individual-

level distortions such as ambition, bias, and corruption. The discussion highlights remedies proposed in the literature, including foresight and scenario planning, doctrinal integration, adaptive procurement, and oversight mechanisms, while stressing that these measures must be reinforced by cultural transformation and leadership reform. The analysis is anchored by three diagnostic tables that summarise uncertainty (table 1), institutional barriers (table 2), and behavioural dysfunctions (table 3). The chapter concludes with the argument that competitiveness cannot be secured through isolated reforms. Instead, it requires an integrated framework linking adaptability, institutional coherence, and behavioural integrity—an agenda that sets the foundation for the empirical and theoretical development of competitive defence in later chapters.

Chapter 3 explains the methodological approach used to examine defence competitiveness. It combines comparative case studies with process tracing and documentary analysis, a design chosen to capture both variation across countries and the dynamics of reform over time. The case selection—NATO, UK, Belgium, Canada, Austria, Ukraine—offers diversity in institutional maturity, political culture, and strategic context, ranging from established alliance members to a state reforming under wartime conditions. Evidence is drawn mainly from official documents, parliamentary reports, policy analyses, and academic literature, with findings structured through systematic coding and triangulation. A central feature of the methodology is the dual-track perspective (table 5), which distinguishes institutional/structural reforms from behavioural/leadership interventions. This framework, complemented by adaptive planning tools and reform mappings, provides consistency across cases and enables the synthesis developed in chapter 5. The chapter concludes by acknowledging limitations such as reliance on documentary evidence and the Western focus of case selection, while arguing that the design remains robust for analysing how uncertainty, institutional barriers, and behavioural dysfunctions shape defence planning.

Chapter 4 provides the empirical foundation of the thesis through a comparative analysis of Belgium, Canada, Austria, Ukraine, and NATO. It examines how these defence organisations managed uncertainty, confronted institutional barriers, and addressed behavioural dysfunctions. The findings show that uncertainty is a structural condition, requiring institutionalised foresight, scenario planning, and adaptive force design. Structural dysfunctions—such as interservice rivalry, fragmented governance, and procurement bottlenecks—were recurrent but could be mitigated through reforms like doctrinal

integration, joint education, and stronger oversight. Behavioural pathologies—ambition, bias, rent-seeking, and corruption—distorted resource allocation, though democratic scrutiny and wartime urgency sometimes created opportunities for corrective action. Using analytical tools such as table 5 (institutional vs. behavioural interventions) and tables 17–18 (dysfunctions and countermeasures), the chapter demonstrates that sustainable reform requires a dual-track approach. Cases that addressed only one dimension achieved partial or temporary gains, while those combining institutional, cultural, and behavioural measures generated more durable improvements. These insights directly inform the integrative framework developed in chapter 5.

Chapter 5 synthesises the empirical insights into a set of frameworks that culminate in the definition and operationalisation of competitive defence. Building on the diagnostic problem clusters identified in tables 1–3, it develops an analytical dual-track framework (table 5) to distinguish between institutional reforms and behavioural interventions. The chapter then introduces and integrates strategic logics (tables 6–8), advances an adaptive planning model (table 9), and maps reform pathways (tables 17–18). These steps converge in the competitive defence framework (table 19), a seven-domain architecture that combines strategic adaptability, institutional coherence, and behavioural integrity. Finally, the chapter operationalises this architecture through a phased implementation roadmap and monitoring regime (5.4.10), ensuring that the framework is actionable. It concludes by offering a novel definition of competitive defence as the capacity of defence institutions to sustain advantage in volatile environments through adaptability, coherence, and integrity.

Chapter 6 concludes the thesis by consolidating its findings, outlining theoretical contributions, and offering practical recommendations. It first situates the research within the broader challenges of uncertainty, institutional barriers, and behavioural dysfunctions, before showing how the study's objectives have been addressed. The synthesis of findings highlights that sustainable reform requires a dual-track approach combining structural coherence with behavioural integrity, operationalised through the competitive defence framework in table 19. The chapter then sets out contributions to scholarship on uncertainty, institutional theory, and civil–military relations, culminating in the novel definition of competitive defence. Policy and practice recommendations are structured across strategic, institutional, operational, and governance levels, supported by guidance on phased implementation and monitoring. Limitations and avenues for future research are acknowledged, with emphasis on testing the framework in non-Western contexts and

emerging domains. The chapter closes by affirming that defence competitiveness lies not in resources alone, but in institutions capable of adaptation, reform, and legitimacy under enduring uncertainty.

2. Literature review and theoretical framework

This chapter examines the main bodies of scholarship that underpin the development of a comprehensive framework for competitive defence. By engaging with interdisciplinary perspectives—from strategic studies, political science, and organisational theory—it addresses the critical challenges identified in the problem statement: unresolvable uncertainty, structural and institutional barriers, and behavioural dysfunctions such as ambition, bias, and corruption. The review is organised around three thematic strands. The first investigates how defence organisations have approached uncertainty, focusing on scenario-based planning, risk management, and strategic agility. The second explores institutional constraints, analysing doctrinal integration, interservice coordination, and civilian oversight as avenues to enhance coherence. The third considers behavioural and governance challenges, including rivalry, corruption, and rent-seeking, while highlighting proposed safeguards for transparency and accountability. Together, these literatures establish the theoretical foundations for analysing case studies and synthesising a competitive defence framework capable of fostering adaptability, resilience, and legitimacy in complex strategic environments.

2.1 Addressing uncertainty in defence strategy and planning

Unresolvable uncertainty, as conceptualized by Taleb (2007), describes conditions where outcomes and probabilities are fundamentally unknowable due to inherent complexity or volatility. This concept is particularly relevant to defence planning, where the dynamic and unpredictable nature of threats requires frameworks capable of adapting to unforeseen challenges. Defence planning involves preparing for the future defence of a polity across near-, medium-, and long-term horizons (Gray, 2014, p. 4) by building the necessary military capabilities—forces and equipment—to meet strategic ambitions and address emerging threats (Mauro, 2018, p. 8).

This subchapter draws on a multidisciplinary theoretical foundation that includes chaos theory, complexity theory, risk society theory, scenario-based planning, and strategic agility. Additional insights from systems thinking and behavioural economics further enrich this framework, facilitating strategies that thrive in uncertain and volatile environments.

Gleick's (1987) chaos theory highlights how small changes in initial conditions can lead to disproportionately large and unpredictable outcomes, underscoring the need for resilient and adaptive decision-making. Holland's (1992) complexity theory complements this by examining how interconnected systems evolve and adapt, providing insights into

volatile defence scenarios. Senge's (2006) systems thinking approach integrates these ideas, using feedback loops to enable continuous strategic adjustments.

Beck's (1992) risk society theory underscores the challenges of managing risks that exceed calculable probabilities, emphasizing the need to incorporate societal and political dimensions into risk management. Kahneman and Tversky's (1979) prospect theory and behavioural economics further enrich this perspective by exploring cognitive biases in decision-making under uncertainty.

Traditional probabilistic models are insufficient in such contexts, calling for adaptive frameworks. Walker, Haasnoot, and Kwakkel (2013) advocate for flexible, dynamically responsive strategies to navigate volatility.

Building on the institutional barriers outlined in table 1, this subchapter critically reviews key methodologies, findings, and gaps in the literature, establishing a theoretical foundation for managing uncertainty and complexity in defence planning.

2.1.1 Scenario-based planning

The concept of "foresight," introduced by Gaston Berger in 1957, emphasizes anticipating future developments to inform present decisions. Joseph Coates distinguishes between prediction—precise short-term forecasts—and foresight, which involves identifying alternative futures over longer time frames (Godet, 2006, pp. 317–318). Coates further notes that scenarios can be developed for each of these alternative futures, serving as presentation tools, though their inclusion is optional (Godet, 2006, pp. 317–318). On the other hand, Godet (2006, pp. 171, 172, 306, 308) refers to foresight as a future-thinking process or scenario planning.

Foresight facilitates the development of systemic understanding and generates plausible and coherent images of the future. This participatory process ranges from creating alternative (exploratory or normative) scenarios to vision building, fostering collective intelligence about the medium- to long-term future (European Training Foundation, 2014, pp. 34-35; Störmer et al., 2020, pp. 131–133). Strategic foresight emerges from the integration of foresight practices into the strategy and policy-making process (Peco-Yeste, 2024, p. 10). It enables organisations to perceive, interpret, and act upon emerging future possibilities, moving beyond traditional forecast-based planning models (Observatory of Public Sector Information, 2021, p. 2; Peco-Yeste, 2024, p. 10). This approach involves systematic and participatory methods to support informed decision-making and cultivate

proactive responses to change (Conway, 2015, pp. 2–3; European Training Foundation, 2014, pp. 26-27, 51; Miles & Keenan, 2002, p. 13; Störmer et al., 2020, p. 133).

Foresight processes typically include stages such as scoping, information gathering (horizon scanning and key drivers identification), analysis (key drivers ranking), scenario generation, and strategy development (Bishop & Hines, 2012, pp. 56–57; Miles, 2002, pp. 7–8; Peco-Yeste, 2024, pp. 17-32; Popper, 2011; Popper, 2018; Voros, 2003, p. 15). While terminologies vary, there is consensus on the importance of structured processes incorporating management, communication, and evaluation. Additionally, participatory approaches that recruit diverse stakeholders are emphasised for their role in fostering inclusivity and insight (Conway, 2015; Magruk, 2011, p. 702; Popper, 2018).

Magruk (2011, p. 710) classifies foresight methods into ten clusters: *Consultative* (e.g., expert panels, interviews, brainstorming), *Creative* (e.g., wargaming, wild cards, role play), *Prescriptive* (e.g., backcasting, relevance trees, TRIZ–Theory of Inventive Problem Solving), *Multicriterial* (e.g., Analytic Hierarchy Process, Data Envelopment Analysis, Multiple Criteria Decision Making Methods), *Radar* (e.g., technology mapping, webometrics, analogies), *Simulation* (e.g., trend extrapolation, system dynamics, simulation and modelling), *Diagnostic* (e.g., STEEPVL–social, technological, economic, environmental, political, values and legal factors analysis, SWOT–strengths, weaknesses, opportunities, and threats, theory of constraints), *Analytical* (e.g., cross-impact analysis, trend impact analysis, structural analysis), *Survey-based* (e.g., literature review, web research, back-view mirror analysis), and *Strategic* (e.g., technology roadmapping, delphi method, causal layered analysis). To enhance the methodological selection, a numerical taxonomy approach is applied to group foresight methods into homogeneous clusters, ensuring that methods within each cluster are either complementary or substitutable, allowing researchers to tailor their methodological choices to specific research objectives.

Ejdys et al. (2023, pp. 7–8) expand on these approaches, providing a detailed breakdown of foresight phases along with recommended methods for each stage:

- Initial phase – Defines the rationale, scope, objectives, methodology, duration and time horizon of the research, and identifies available resources. Recommended methods include consultative, radar, analytical, and survey approaches.
- Scanning phase – Identifies and analyses trends and changes affecting future developments. Utilizes diagnostic, radar, survey, and analytical methods.

- Recruitment phase – Engages stakeholders and domain experts while forming research panels. Methods include consultative, analytical, and survey techniques.
- Knowledge generation phase – Synthesizes existing information to generate new insights, identifying key trends and driving forces. Uses creative, consultative, prescriptive, strategic, simulation, analytical, and multicriteria methods.
- Anticipation phase – Predicts possible future scenarios and generates strategic recommendations. Primarily employs strategic, prescriptive, creative, simulation, consultative, and multicriteria methods.
- Action phase – Transforms foresight findings into concrete strategies, plans, and policies. Uses strategic, consultative, simulation, diagnostic, creative, prescriptive, and analytical methods.
- Evaluation phase – Assesses the effectiveness and relevance of foresight actions, informing decision-making. Methods include consultative, diagnostic, analytical, and survey approaches.
- Resumption phase – Reactivates the foresight cycle based on evaluation results after a defined period (e.g., several years). Focuses on identifying success factors to guide the next research cycle. Primarily employs consultative and diagnostic methods.

Exploratory scenarios are constructed by combining key drivers, such as trends and uncertainties (Peco-Yeste, 2024, p. 11). Scenario-based planning, described by Schoemaker (1995, p. 25) as "a disciplined method for imagining possible futures," is crucial for managing uncertainty, particularly in military contexts. A common 2×2 scenario approach combines the extreme values of two critical uncertainties while incorporating high-impact trends (Peco-Yeste, 2024, p. 42). Foundational works by Schwartz (*The Art of the Long View*, 1991), Schoemaker (*Scenario Planning: A Tool for Strategic Thinking*, 1995), and van der Heijden (*Scenarios: The Art of Strategic Conversation*, 1996) highlight the critical role of scenario planning in preparing for multiple future possibilities. These authors advocate integrating systems thinking and organisational learning to enhance strategic adaptability.

Fink and Schlake's *Scenario Management: An Approach for Strategic Foresight* (2000) and Denis Loveridge's *Foresight: The Art and Science of Anticipating the Future* (2009) outline comprehensive methodologies for scenario development, integrating principles of systems thinking, strategic foresight, and future-open thinking. These

approaches emphasise decentralised scenario creation, early-warning systems, and scenario-aided strategy processes to foster proactive and adaptive planning.

Further enriching the strategic toolkit, Postma and Liebl (2005) propose alternative methodologies such as recombinant and paradoxical scenarios, while Huss and Honton (1987) explore intuitive logics and cross-impact analysis. Johansen's *Scenario Modelling with Morphological Analysis* (2018) adds depth and internal consistency to scenario design, particularly in complex and uncertain environments. Ramírez and van der Heijden (2007, pp. 118–119) emphasize the iterative nature of scenario planning, advocating for continuous updates to align with emerging trends.

Technological advancements, including computational modelling and machine learning, have improved scenario planning by enabling real-time updates and adaptability (Brynjolfsson & McAfee, 2017). Stakeholder engagement remains vital, as participatory approaches enhance inclusivity and strategic insight (Berkhout & Hertin, 2002, p. 48; Curry, 2007, pp. 360–363; Godet, 2006, pp. 18–20, 138).

Despite its strategic benefits, scenario-based planning is not without its challenges. Amer et al. (2013) critique its limitations in addressing rapidly evolving crises, emphasizing the need for more agile frameworks capable of real-time adaptation. Wilkenfeld and Murauskaite's *Escalation Management in the Gray Zone* (2021) explore its application in managing hybrid conflicts, aligning with Cabral Couto's (1988, pp. 154) insights on "insidious actions" in ambiguous scenarios. Moreover, Peco-Yeste (2024, pp. 13–14) identifies several obstacles to fostering a culture of foresight within organisations. These include short-termism and risk aversion, a lack of specialised skills within public administration, the presence of organisational and sectoral silos and limited accessibility or lack of timeliness of strategic foresight products for decision-makers that hinder collaboration and strategic thinking. To address these obstacles the author recommends securing policymakers' involvement, ensuring resources and mandates, enhancing the credibility of foresight practitioners, embedding light-touch foresight work into policy cycles with relevant outputs, and refining practices through feedback and impact assessments exercises.

To sum up, scenario-based planning is described as a systematic approach to imagine, prepare for, and develop robust strategies across potential future contingencies. These studies highlight the need for continuous refinement, technological integration, and strong organisational support to navigate the complexities of modern defence contexts.

2.1.2 Strategic agility in defence

Strategic agility is vital for defence organisations to respond to evolving threats and seize opportunities. Doz and Kosonen's *The Dynamics of Strategic Agility: Nokia's Rollercoaster Experience* (2008) and Weber and Tarba's *Strategic Agility: A State of the Art Introduction to the Special Section on Strategic Agility* (2014) provide foundational insights into the concept. Both works emphasize the importance of sensing environmental changes, unifying leadership efforts, and ensuring resource fluidity to enable swift organisational adaptation.

In defence contexts, strategic agility extends beyond rapid force deployment, encompassing strategic planning and decision-making processes across the organisation (Bekkers & Spiegeleire, 2010, p. 436). This aligns with Gray's (2014, p. 155) assertion that defence planning must guarantee the suitability, adaptability, and readiness of military capabilities to safeguard national interests.

Strategic agility is often conceptualized as a combination of key meta-capabilities. Doz and Kosonen (2008, p. 96; 2010, p. 371) identify these as strategic sensitivity, leadership unity, and resource fluidity. Similarly, Weber and Tarba (2014, p. 6) emphasize two primary dimensions: leadership's ability to sense the need for change and marshal resources for execution, and the organisational design's capacity for structural adaptation to implement strategic actions effectively.

The U.S. Navy's *Naval Agility: Critical Initiatives* (Miller, 2019) identifies five pillars of agility: aligned strategy and leadership, adaptable platforms and personnel, smart and rapid acquisition processes, secure and shareable information systems, and transparency and accountability. These elements underline the need for innovation, collaboration, and visibility within agile organisations. Decentralized decision-making is also key. Mintzberg (1994, pp. 109–110) advocates for empowering lower-level managers, supported by Alberts and Hayes' *Power to the Edge* (2003) and NATO STO's *Command and Control (C2) Agility* (2014), which introduces adaptable command frameworks.

Decision-making under uncertainty is another critical aspect of strategic agility. Klein's *Sources of Power* (1999) introduces the Recognition-Primed Decision (RPD) model, suggesting how intuition and expertise aid decision-making in high-stakes scenarios. Li et al. (2020) extend this concept, highlighting the integration of human expertise with technologies like AI and machine learning to enhance decision-making processes.

The *Cynefin* framework, created by David Snowden in 1999, is a decision-making tool that helps individuals and organisations navigate complexity and uncertainty. It categorizes situations into five domains, guiding managers in understanding and responding to different challenges. Rooted in systems, complexity, network, and learning theories, it provides a structured approach to problem-solving (Snowden & Boone, 2007). The term *Cynefin*, meaning "habitat" in Welsh, reflects its focus on context and sensemaking.

The Decision-Making Under Deep Uncertainty paradigm (Marchau et al., 2019, pp. 357–359; Walker et al., 2013, pp. 964–969, 972) offers advanced tools to navigate complexity:

- Exploratory modelling. Computational experiments to test strategies across diverse futures, identifying vulnerabilities and ensuring robustness.
- Adaptive planning. Dynamic frameworks such as Dynamic Adaptive Policy Pathways and Robust Decision-Making enable iterative adjustments based on real-time data.
- Decision support. Tools and frameworks clarify trade-offs, engage stakeholders, and enhance iterative evaluations.

These methods shift defence planning from prediction-based models to strategies emphasizing flexibility, robustness, and long-term adaptability.

Strategic agility also involves fostering collaborative environments. Nonaka (1994, pp. 24–29) highlights the importance of cross-departmental collaboration to reduce silos and improve knowledge-sharing. Edmondson's (1999, pp. 375–376) concept of psychological safety highlights the importance of creating conditions conducive to experimentation and innovation. Meanwhile, Teece, Pisano, and Shuen (1997, pp. 510–511, 523–529) emphasise the role of dynamic capabilities, which enable organisations to sense and seize opportunities in volatile environments.

Scollick (2020, p. 35) presents an evolution of an Adaptive Planning approach which incorporates early interagency and coalition collaboration, integrated intelligence planning linked to global changes, and embedded options for flexibility with branches and decision points. Plans are maintained as "living documents" in virtual environments, updated continuously to reflect changes in intelligence, readiness, and strategic conditions. The network-centric Adaptive Planning approach leverages technology, AI, and collaborative tools to enable parallel planning and shorten decision-making cycles.

In summary, strategic agility in defence contexts consists on the ability of defence organisations to adapt rapidly to evolving threats and opportunities while maintaining operational effectiveness. It requires a multifaceted approach, integrating decentralized decision-making, adaptive organisational structures, and advanced technological capabilities. Leadership commitment, cross-functional collaboration, and a continuous focus on adaptability are imperative to navigate the complexities and uncertainties of modern defence challenges effectively.

2.1.3 Risk management in defence

Risk management is a fundamental pillar of defence strategies, offering tools to identify, assess, and mitigate potential threats in complex and uncertain environments. Traditional risk models, however, often fall short in addressing extreme uncertainty. Taleb's works, *The Black Swan: The Impact of the Highly Improbable* (2007) and *Antifragile: Things That Gain from Disorder* (2012) critique these limitations, advocating for systems that not only endure but thrive amidst disruption. Operationalising these concepts within military contexts, however, remains a significant challenge.

Quantitative risk models, such as Kaplan and Garrick's (1981) framework, offer a structured method for addressing measurable risks but is less suited to scenarios involving unquantifiable uncertainties. Similarly, Frame's *Managing Risk in Organisations* (2003) offers valuable insights from corporate risk management, yet these frameworks require substantial adaptation to address the unique complexities of defence environments.

Recent contributions have sought to address these gaps by integrating military-specific considerations. The U.S. Department of Defense (DoD) *Risk, Issue, and Opportunity (RIO) Management Guide for Defense Acquisition Programs* (2023) highlights early risk identification, structured mitigation plans, and continuous monitoring. Bartolomeu and Água's *Framework for Assessing the Impacts of Potentially Disruptive Military Technologies* (2022) introduces a multidimensional approach for evaluating emerging technologies—strategic, operational, tactical, technical, and organisational—, aiding decision-makers in balancing investments and capability development. Kaplan and Mikes (2012) categorise risks into three types—preventable risks, strategy risks, and external risks—advocating tailored approaches that integrate internal controls, scenario analysis, and a risk-aware organisational culture. These frameworks emphasise the need for adaptive strategies that align risk management with dynamic planning processes, fostering flexibility and resilience.

Quantitative and data-driven approaches further bolster risk assessment accuracy. Kaplan and Garrick (1981, pp. 12–13) stress rigorous risk identification processes, while Aven (2011, pp. 25–28) advocates for comprehensive vulnerability assessments. Quantitative models (Haimes, 2009, pp. 50–52) and data-driven evaluation methods (Hubbard, 2020, p. 62) enhance analytical precision. Taleb's (2012, pp. 210–211) concept of antifragility complements these frameworks by advocating for systems that grow stronger when exposed to manageable risks.

The NATO *Risk-Based Framework for Strategic Planning* (NATO STO, 2018, pp. 4-4; A-1 – A-36) integrates risk management with strategic planning through seven phases: Communication and Consultation, Establishing the Context, Risk Identification, Risk Analysis, Risk Evaluation, Risk Treatment, and Monitoring and Review. By aligning these phases with five planning steps (Preparing, Setting Up, Creating, Executing, and Learning Lessons), NATO's framework ensures adaptability and resilience in addressing defence planning objectives.

Despite the promise of integrated frameworks, practical implementation often faces obstacles. Cole and Olympiou's (2022) study on risk management during the Afghanistan crisis highlights gaps in crisis preparedness, underscoring the need for adaptive leadership, enhanced tools, and a cultural shift from prediction to preparedness. Organisational resistance and limited empirical validation further hinder the application of these models in defence settings.

All in all, risk management consists on strategies and tools to identify, assess, and mitigate threats in uncertain defence environments. It is evolving to address the limitations of traditional models, particularly in contexts of deep uncertainty. Recent advancements, including multidimensional frameworks and data-driven approaches, provide more robust tools for assessing and mitigating risks. However, operationalising these methods requires overcoming organisational resistance and adapting them to the unique challenges of military environments. By fostering adaptive leadership, integrating quantitative and scenario-based techniques, and embracing antifragility principles, defence organisations can better navigate the complexities and uncertainties of modern risk landscapes.

2.1.4 Summary and theoretical implications

This subchapter examined the dimensions of Scenario-Based Planning, Strategic Agility, and Risk Management in defence, synthesising insights from the literature and identifying recurring patterns and gaps.

Scenario-based planning plays a crucial role in managing uncertainty, leveraging foresight, adaptability, and inclusivity to develop robust strategic responses. The literature highlights the importance of trend analysis and scenario updates; however, operationalising these elements often lacks sufficient automation and real-time integration. Additionally, the inclusion of disruptive trends such as hybrid warfare and AI-driven conflicts remains underexplored in practice.

Strategic agility complements these efforts by emphasising sensitivity, resource fluidity, and decentralised decision-making to foster rapid adaptability. Frameworks such as those developed by NATO and the U.S. DoD offer structured methodologies, yet they often fail to address the practical implementation of psychological safety and cross-departmental collaboration effectively. Advances in AI and predictive tools enhance agility, but their integration into routine processes is inconsistent and requires further refinement.

Risk management frameworks increasingly adopt quantitative models and dynamic capabilities but face challenges in embedding antifragility principles and leveraging feedback mechanisms for continuous improvement. Predictive models alone are insufficient for addressing emergent risks, needing enhanced scenario vulnerability assessments and resilience measures.

Across these areas, significant gaps in the literature emerge. Existing frameworks frequently operate in silos, with insufficient emphasis on integrating scenario-based planning, agility mechanisms, and risk management into a cohesive system. The framework in table 4 provides a structured approach to addressing unresolvable uncertainty in defence planning.

Table 4 – Framework draft for adaptive defence planning under unresolvable uncertainty

Phase	Activities
1. Scoping and context setting	- Define the foresight purpose, background, scope, parameters, methodology, duration, and time horizon. - Assess available financial, technological, and HRs. - Mobilize key stakeholders and domain experts to ensure a multidisciplinary perspective.
2. Environmental sensing and information gathering	- Conduct continuous STEEPVL/PMESII-PT (Political, Military, Economic, Social, Information, Infrastructure, Physical Environment, and Time) analysis using expert panels, surveys, and available intelligence sources. - Identify and track emerging trends, uncertainties, and disruptive factors. - Integrate real-time intelligence sharing mechanisms to enhance situational awareness and adaptability.
3. Analysis	- Apply systems-thinking frameworks to interpret data and identify key drivers of change. - Analyse historical patterns to assess the evolution of identified trends. - Use multidimensional frameworks to evaluate the implications of emerging and disruptive technologies.

	- Assess interdependencies among drivers (trends or uncertainties) using structural and cross-impact analysis. - Rank key drivers based on their impact and level of uncertainty. - Develop profiles for emerging threats, vulnerabilities, and opportunities. - Conduct integrated vulnerability, threat, and opportunity analyses.
4. Vision building (political guidance), scenario generation and testing	- Host collaborative visioning workshops with stakeholders. - Develop strategic/operational scenarios. - Compare the developed scenarios against the current situation. - Conduct stress tests for extreme scenarios, including hybrid warfare and cyber threats. - Use morphological analysis to ensure scenario consistency and plausibility. - Integrate quantitative models and data-driven evaluation techniques. - Regularly update scenarios based on emerging data to maintain relevance. - Apply “backcasting” methods to align ends, ways, and means.
5. Risk evaluation, validation and communication	- Identify and assess preventable and external risks using multidisciplinary risk assessment tools. - Align long-term strategic vision with organisational capabilities (level of ambition). - Assess political and strategic risks, including overreach (expanding beyond feasible limits in foreign and defence policy) and gaps between the required force structure, capabilities, and available resources. - Categorise, prioritise, and define acceptable risk tolerance measures. - Validate risk assessments through structured consultations. - Ensure timely dissemination of findings via classified briefings and internal reports, with declassified insights shared publicly.
6. Strategy development and risk mitigation	- Develop adaptive strategies aligned with evolving security priorities and multiple futures. - Develop actionable mitigation plans for high-priority risks. - Ensure financial sustainability to support defined strategies without interruptions. - Build secure, interoperable systems for data sharing. - Integrate intelligence planning with global developments, ensuring flexibility through embedded options with branches and decision points. - Establish measures to monitor (early-warning systems), influence, and mitigate the impact of key strategic drivers. - Maintain plans as living documents in virtual environments, continuously updated based on intelligence, readiness, and strategic conditions. - Establish formal interagency collaboration mechanisms. - Embed measurable performance indicators to ensure accountability, using structured assessments in defence planning, operational readiness, governance integrity, burden-sharing, and cyber resilience.
7. Organisational adaptation	- Foster decentralised and adaptive command structures. - Design flexible organisational frameworks to enhance agility. - Embed AI and advanced analytics in decision-making. - Empower mid-level decision-makers with resources and authority. - Establish units dedicated to innovation.
8. Implementation and resource management	- Integrate strategic foresight and risk management into decision-making. - Develop resilient platforms adaptable to evolving threats. - Enhance procurement agility to rapidly adapt to operational and technological shifts. - Establish real-time resource tracking for dynamic reallocation. - Create mechanisms for resolving inter-service resource conflicts through joint planning, coordination, and prioritization.
9. Collaborative Governance	- Establish participatory platforms for cross-sector decision-making and knowledge-sharing. - Cultivate a risk-aware, adaptable, and ethically responsible organisational culture. - Develop ethical guidelines and training programmes for the responsible use of autonomous and AI-enabled systems.

10. Crisis response and Black Swan preparedness	- Establish rapid-decision task forces for emergent multi-domain scenarios. - Conduct regular stress tests on critical defence infrastructure, command-and-control networks, and logistics. - Develop contingency plans and training simulations for high-impact, low-probability (Black Swan) events.
11. Monitoring, feedback, and continuous learning	- Develop and refine key performance indicators to assess strategy effectiveness. - Integrate lessons learned into strategic revisions for continuous improvement.

Many models, particularly those adapted from corporate risk management, lack extensive empirical validation in defence-specific contexts. Furthermore, while trend analysis successfully identifies emerging technologies such as AI, the operationalisation of these insights remains limited, calling for more focused efforts to bridge such gap.

Integrating these approaches offers a promising pathway for enhancing adaptability, resilience, and inclusivity in defence planning. By analysing NATO's processes alongside the UK (when relevant), chapter 4 offers insights into their real-world implementation, highlighting best practices and identifying areas for further refinement complementing the framework.

2.2 Theorising solutions to structural and institutional constraints in defence planning

Building on the structural and institutional barriers outlined in table 2, this subchapter reviews relevant literature to identify strategic pathways for reform. It focuses on how defence organisations can enhance strategic coherence, democratic legitimacy, and resource allocation through institutional solutions such as joint planning, adaptive governance, and cultural integration. Particular attention is given to recent scholarly contributions on doctrinal integration, interoperability in multi-domain operations, strategic oversight, budgetary alignment, institutional innovation, democratic civilian control, and military–civilian collaboration. The review also highlights the enduring challenge of fostering a joint culture that bridges organisational rivalry while reinforcing accountability and transparency. These insights form the conceptual basis for the empirical analysis that follows.

2.2.1 Enhancing joint strategy through doctrinal integration, institutional learning, and interoperability in multi-domain operations

A coherent joint strategy is essential for ensuring effective power projection, particularly in response to regional contingencies. Within such a strategy, military services inevitably compete over the relative effectiveness and efficiency of their contributions

(Snider, 1996, p. 21). However, without mechanisms to align these contributions, interservice competition and fragmented approaches can undermine strategic coherence. To address this, “silos” must be interconnected into a systemic arrangement through effective coordination mechanisms rather than functioning in isolation (Lyle, 2019, August 5, p. 4). Dynamic and iterative strategic planning frameworks should replace rigid, top-down planning models to enable timely adaptation to emergent operational realities. (Schlueter et al., 2025, p. 24).

Interoperability must not only be a technical condition but also an institutional imperative, continuously reinforced through doctrine, processes, and accountability structures.

For instance, the 2022 National Defense Strategy of the U.S. prioritises building a resilient Joint Force through an “integrated deterrence” methodology, which necessitates seamless cooperation across military domains and with allied forces (U.S. DoD, 2022, October 27, pp. 8, 10). This shift requires aligning objectives across services to promote joint operational effectiveness (Teague & Braswell, 2023, March, p. 3). Furthermore, restructuring the Joint Staff to include a dedicated design and strategy division that directly supports the Secretary of Defense in strategic decision-making could enhance coherence between policy, planning, and operational execution, and foster improved integration, unity of effort, and strategic alignment across the joint services (Lyle, 2019, August 5, p. 11).

A joint doctrine is essential for guiding the employment of forces from multiple services toward a common objective. It promotes interservice interoperability by ensuring compatibility in strategy, operations, logistics, and command structures, thus preventing inefficiencies such as duplication of effort and misaligned procurement processes (Collins, 2002, pp. 101–102; Cozad et al., 2023, p. 45). Additionally, joint doctrine facilitates effective collaboration with civilian agencies and allied forces, strengthening integrated deterrence and mitigation planning (Teague & Braswell, 2023, March, p. 3).

Despite significant progress since the Goldwater-Nichols Act (GNA) of 1986 (Forster, 2012, p. vii; Lovelace & Young, 1997, p. 94; Snider, 1996, p. 22), interoperability challenges remain, including differences in command structures and communication systems, which continue to create friction between services (Forster, 2012, pp. 9–11, 15–16; Kobs, 2011). While joint doctrine promotes a shared operational perspective, its effectiveness depends on continuous adaptation to evolving threats and strategic priorities (Lovelace & Young, 1997, p. 94; Westa, 1999, p. 2).

To enhance joint operations, scenario-based planning, wargames, and computer simulations should be integrated into strategic planning to assess cross-service dependencies and anticipate operational challenges (Ochmanek et al., 2023, p. 17). At the tactical level, lessons learned from joint air operations, close air support (CAS), and special operations have contributed to improved interoperability (Cozad et al., 2023, p. 185). However, the limited institutionalisation of lessons learned from recent and ongoing conflicts constrains the adaptability of joint doctrine and weakens strategic foresight. To address this shortfall, MoDs should establish clear lines of accountability for the systematic codification and integration of operational insights into defence policy and doctrine (Schlueter et al., 2025, p. 24). Similarly, defence leadership should implement a formalised mechanism for consolidating and disseminating lessons learned from joint, multi-domain experimentation and operational activities across the broader defence enterprise (NATO STO, 2024, May, p. 2-37; U.S. Government Accountability Office, 2025, April, p. 26). Furthermore, the development of centralised knowledge dissemination platforms is essential to enable structured and continuous learning across commands, services, partner nations, and alliances. Such platforms would cultivate a shared understanding of emerging threats and corresponding responses, thereby enhancing the agility and resilience of joint forces (Schlueter et al., 2025, p. 24).

Ultimately, the effectiveness of joint doctrine and strategy depends on strategic alignment, institutional learning, adaptable planning, and sustained commitment to interoperability at all levels of defence governance (Cozad et al., 2023, p. 46; Scollick, 2020, p. 32). Continuous efforts to reform structures, update doctrine, and institutionalise knowledge from ongoing conflicts are not optional—they are essential for maintaining operational superiority in complex, multi-domain environments.

2.2.2 Enhancing strategic oversight and institutional coordination

Leadership at all levels should promote respect for the roles and contributions of each service (Teague & Braswell, 2023, March, p. 3). Celebrating joint successes can help bridge gaps in understanding and build camaraderie among branches.

A key solution to overcoming institutional barriers in defence planning is strengthening political oversight and strategic leadership. Elliott (2015, p. 222) argues that defence reforms should commence with the establishment of a War Cabinet and a more direct role for political leaders in strategic decision-making. This would ensure that military commitments are grounded in rigorous strategic assessments and transparent decision-

making processes. Additionally, maintaining permanent records of these decisions—detailing accountability and rationale—would reinforce discipline among stakeholders (Elliott, 2015, pp. 223, 229). Military leadership must also advocate assertively against resource constraints that compromise operational effectiveness, ensuring sufficient reserves and explicitly outlining the risks associated with inadequate resource allocation (Elliott, 2015, pp. 222–223).

Enhancing joint and integrated structures is another essential measure. Egnell (2013, p. 251) emphasizes that integrated structures enhance information-sharing and strategic alignment. Similarly, NATO research highlights that joint command and control mechanisms significantly improve unity of command and resource distribution in complex expeditionary operations (NATO STO, 2024, May, p. 2-33). The expansion of multinational military initiatives, such as the Franco-British Combined Joint Expeditionary Force (CJEF) and the Joint Expeditionary Force (JEF), further illustrates how flexible coalitions can enhance interoperability and resource optimization outside traditional alliances (Flynn, 2022, p. 318; Saxi, 2017, pp. 175, 190–191). Moreover, Cozad et al. (2023, p. 41) propose structural reforms, including the establishment of centralized institutions for budget planning, interservice coordination, and strategic alignment of financial resources. Initiatives to enhance decision-making speed and coordination across service branches, and the establishment of dedicated services can overcome institutional barriers by clarifying roles and reducing inefficiencies due to service overlap (Cozad et al., 2023, p. 99). Such reforms underscore the need for integrated approaches when addressing emerging domains in modern warfare.

Permanent coordination structures and formal communication channels between services are essential for fostering collaboration. The establishment of liaison officers and exchange programs enhances interdepartmental and international cooperation, promoting effective knowledge management and information sharing (NATO STO, 2024, May, p. 2-36). Regular interservice meetings, joint leadership initiatives, and cross-service assignments strengthen operational cohesion while minimizing interbranch misunderstandings.

Additionally, effective strategic communication is essential for conveying the legitimacy and added value of defence institutions. Transparency, accountability, and proactive engagement with political and civilian stakeholders build trust and ensure alignment with national security priorities (NATO STO, 2024, May, p. 2-37).

2.2.3 Building joint culture and institutional innovation in defence transformation

The creation of a true joint culture is essential for effective defence planning and operations (Snider, 1996, p. 26). Cultural similarities can facilitate cooperation by fostering mutual understanding and trust (NATO STO, 2024, May, p. 2-36). Institutional transformation, however, extends beyond cultural affinity; it demands a deliberate shift toward collaborative structures, incentive alignment, and shared innovation frameworks.

At the core of this transformation lies the reform of promotion and reward mechanisms to actively recognise and incentivise joint contributions. Such reforms align individual and organisational goals with overarching strategic objectives, thereby strengthening cohesion across services (Defense Innovation Board, 2024, July 5, p. 6). In parallel, personnel exchanges between branches should be promoted to deepen cross-service understanding, diminish interservice biases, and cultivate a culture of mutual respect (Lyle, 2019, August 5, p. 4; NATO STO, 2024, May, p. 2-36). Embedding diverse service members into joint project teams fosters knowledge sharing, minimises redundancy, and reinforces a collaborative ethos.

To address enduring institutional barriers—such as talent capability gaps, dysfunctional acquisition systems, excessive risk aversion, and misaligned funding structures—MoDs must adopt a comprehensive approach. Structured diagnostics to assess innovation capability gaps should be followed by the establishment of academic-industry partnerships aimed at bridging these deficiencies (Schlueter et al., 2025, p. 28). Upskilling acquisition personnel with targeted training programs enhances innovation literacy, while institutional reward mechanisms encourage participation in experimental, high-risk projects. Standardised frameworks for assessing risk-reward trade-offs, coupled with reformed procurement procedures, can enable agile and cost-effective capability development. Furthermore, aligning defence funding streams with outcome-based performance metrics, and regularly reassessing the value of strategic partnerships, contributes to more effective resource deployment and collaborative returns (Schlueter et al., 2025, p. 28).

Overinvestment in bespoke platforms remains a persistent challenge in strategic planning. Schlueter et al. (2025, p. 15) emphasise the need for capability-based evaluation metrics, ensuring that platform development aligns with verified global demand operational scenarios and avoids underutilisation. Investment coordination among allies can mitigate redundancy and optimise multinational capability portfolios. Transitioning toward

distributed, autonomous, and networked systems enhances resilience and operational flexibility. Additionally, platform development should adopt a Modular Open Systems Approach (MOSA) with continuous user feedback, accelerating innovation cycles and improving adaptability. Rationalising platform portfolios and concentrating on high-impact capabilities contributes to strategic coherence while balancing national technology sovereignty with efficiency (Schlueter et al., 2025, p. 15).

The underutilisation of AI across defence organisations also constrains institutional agility. Defining clear productivity governance structures for AI implementation, while balancing investment across operational and support domains, is critical (Schlueter et al., 2025, p. 18). Functional audits should identify domains with high productivity potential, prioritising low-risk and commercially supported AI solutions. Digital upskilling programs and phased infrastructure modernisation can enhance readiness and maximise integration outcomes. Moreover, workforce redeployment strategies should reassign personnel from low-value tasks to roles that complement AI-enhanced operations (Schlueter et al., 2025, p. 18).

The development of high-performing security networks is another critical element. Whelan (2014, pp. 6–7) identifies five interdependent levels of analysis for managing cooperation: structural, cultural, policy, technological, and relational factors. Strong networks emphasize collaboration over mere coordination, requiring stable membership, positive relationships, and shared experiences to function optimally (Whelan, 2014, p. 66). Informal communities of practice, established through joint exercises, seminars, and conferences, facilitate multidisciplinary perspectives and innovation by allowing personnel to engage in knowledge-sharing outside of formal command structures (Lyle, 2019, August 5, p. 10; Roud, 2021, p. 10).

Strategic alliances between defence organisations, private sector firms, and research institutions also enhance innovation. The Knowledge & Innovation Management (KIM) model, which integrates Innovation and Knowledge Networks within shared cooperative projects through strategic alliances, has demonstrated a positive impact on technology transfer and project performance in the defence sector (Briones-Peñalver et al., 2020, pp. 597, 610–611). Open innovation practices are essential for maintaining a competitive edge against technologically advanced adversaries. Whenever possible, transitioning from closed to open systems enables military services to incorporate emerging technologies effectively,

reduce redundancy, and foster a culture of shared technological advancement (Stanley-Lockman, 2021, p. 482).

Institutional responses must also consider changes in the defence industrial base. Overlooking shifts in this industrial base hampers access to innovation. Operationalising non-traditional engagements through actionable roadmaps and redefining the industrial base to include adjacent and dual-use sectors are crucial steps (Schlueter et al., 2025, p. 22). Defence institutions should also promote dual-use awareness via cross-sectoral knowledge platforms and pursue alternative financing mechanisms, including venture capital and public-private partnerships. Modernising acquisition interfaces through digital submissions, model-based engineering, and open architecture standards will further accelerate innovation and attract emerging suppliers (Schlueter et al., 2025, p. 22).

Finally, adapting to increasingly distributed and virtual operational environments needs the development of new collaborative skills. As Swanson et al. (2004, p. 17) note, structured virtual interactions and digital communication protocols are vital for high-quality decision-making in remote settings. Advanced information-sharing platforms can enhance real-time collaboration, bridging organisational gaps and streamlining interservice operations (Robinson & Morrison, 2009, p. 13).

2.2.4 Enhancing interoperability and strategic cohesion through joint education and training

Joint education and training play a critical role in fostering interoperability, strategic adaptability, and overcoming service parochialism in defence organisations. Without these initiatives, military services risk maintaining siloed structures that have historically contributed to operational failures (Cozad et al., 2023, p. 71).

Joint education programs enhance strategic adaptability by facilitating interservice learning and collaboration. These programs enable military personnel to acquire a comprehensive understanding of each service's roles and capabilities, thereby improving joint leadership and coordination in complex operational environments (Cozad et al., 2023, p. 48). Joint Professional Military Education (JPME) initiatives aim to mitigate interservice prejudices and promote joint perspectives among officers (Davis, 2017, pp. 4, 29–30). Additionally, joint duty assignments (JDAs) reinforce cross-service cooperation by linking joint experience to career advancement, ensuring that officers gain firsthand exposure to joint operations (Cozad et al., 2023, p. 61). However, rigid joint requirements can create

challenges, as officers often prioritise fulfilling these mandates over genuine professional development (Cozad et al., 2023, p. 68).

Joint training further enhances interoperability and operational effectiveness by honing coordination and communication skills necessary for joint military operations. NATO's training framework, for example, emphasizes collaboration and shared objectives to address contemporary security challenges (Pînzariu et al., 2024, pp. 112–113). Structured training programs promote cross-branch understanding and trust, ensuring that service members can effectively integrate their distinct capabilities in joint environments (Cozad et al., 2023, p. 50).

Regular joint exercises also enhance collective improvisation capabilities, which are essential for responding to complex military challenges (Roud, 2021, p. 10). Exercises play a crucial role in ensuring interoperability among stakeholders by evaluating specific capabilities, including Host Nation Support (NATO STO, 2024, May, p. 2-37). Moreover, collaboration in high-pressure scenarios improves operational cohesion and effectiveness (Collins, 2002, p. 26).

At the strategic politico-military policy level, the inclusion of political and civil leaders in joint courses and exercises can foster mutual understanding, while the use of a common language—such as English—enhances overall cooperation (NATO STO, 2024, May, p. 2-37). Likewise, standardizing training curricula and implementing cross-service personnel exchanges have been identified as key measures to dismantle tribal mindsets and enhance interservice cooperation (Lyle, 2019, August 5, p. 4).

2.2.5 Budgetary alignment, acquisition reform, and strategic resource management

Addressing institutional barriers in defence planning requires the integration of budgetary harmonization, joint management frameworks, and agile acquisition practices. Establishing a unified budgetary framework aligned with collective defence priorities fosters institutional cooperation by reducing interdepartmental competition for resources (NATO STO, 2024, May, p. 2-36).

Centralized funding mechanisms further reinforce this by prioritizing capability-driven investments linked to interoperability outcomes, thus enabling more efficient resource allocation across joint operational requirements (Castilla, 2024, pp. 96, 197, 341; Cozad et al., 2023, p. 45; Sempere, 2023, p. 95). Joint management initiatives also enhance strategic alignment and unity of command by facilitating information exchange across

services and commands. This is supported by the establishment of joint forums and communication channels that promote forward planning and integrate service-specific needs and capabilities (Cozad et al., 2023, p. 52).

Moreover, integrated management structures strengthen cohesion through shared oversight bodies and collaborative acquisition programs (Cozad et al., 2023, pp. 45, 52). These initiatives also ensure clarity in resource governance by delineating roles and responsibilities, creating dedicated resource management institutions, and providing oversight for DoD-wide and interservice initiatives (Cozad et al., 2023, p. 52).

Joint acquisition programs exemplify this integrated management approach. Programs like the U.S. DoD's Software Acquisition Pathway, prioritise iterative delivery and user engagement, reducing bureaucratic inertia through agile methodologies such as *DevSecOps* and continuous authorization protocols (U.S. DoD, 2023, August 23, p. 1). These initiatives institutionalize cross-service collaboration, ensuring that resource roles and responsibilities are clearly delineated (Cozad et al., 2023, p. 52).

Reforms in defence acquisition aim to accelerate capability delivery while enhancing interoperability. In support of improved defence resource governance, the Commission on Planning, Programming, Budgeting, and Execution (PPBE) Reform (2024, March 6, pp. 3–4) has proposed several measures: (1) aligning multi-year budgets with strategic modernization goals, (2) decentralizing decision-making to empower innovation at operational levels, (3) enhancing transparency and stakeholder communication, (4) adopting modern business systems for improved fiscal accountability, (5) maintaining strict adherence to budget timelines while ensuring inclusivity, and (6) increasing public visibility into defence resource decisions.

To address affordability challenges, MoDs must reform traditional procurement and budgeting practices. Schlueter et al. (2025, p. 9) suggest developing negotiation frameworks that prioritise cost-reduction incentives over escalation through value-based procurement, and enhancing cost estimation models by integrating real-time, market-based indicators; encouraging vendors to adopt commercial production standards via contractual obligations and performance-based incentives, while promoting the acquisition of lower-cost, scalable systems when operational requirements do not necessitate bespoke, high-cost platforms. Lt. Gen. Anderson, , the U.S. Director for Joint Force development, advocates for the development of "truly cheap" weapons and adaptable systems to prepare for high-intensity conflicts. By focusing on cost-effective solutions, services can experiment and provide

feedback, fostering a collaborative environment that prioritises innovation over competition (Panella, 2025, February). Furthermore, total cost of ownership (TCO) assessments should be institutionalized early in the procurement process to ensure long-term affordability and sustainability (Schlueter et al., 2025, pp. 9-10).

2.2.6 Institutionalising democratic civilian control over defence: mechanisms, challenges, and evolving frameworks

A clear division of authority between civilian institutions and the military is a cornerstone of democratic governance. Civilian control—understood as political supremacy over defence affairs—ensures that security decision-making remains within democratically accountable structures. While military expertise contributes significantly to shaping defence policies, it is the constitutional subordination of the armed forces to civilian leadership that upholds democratic legitimacy and prevents authoritarian drift (Joó, 1996).

Effective parliamentary oversight plays a central role in this dynamic. Parliamentary Defence Committees, in coordination with MoDs, must have the authority and capacity to define military roles, budgets, force structures, and foreign deployments (Rawal, 2022, p. 143). For example, Pakistan's National Security Committee institutionalizes regular consultation between civilian and military leaders, thereby narrowing ideological divides and helping prevent unconstitutional interventions by formalizing dialogue while preserving civilian primacy (Akhlaq, 2024, pp. 115, 121).

In addition to political mechanisms, internal military structures must also be aligned to reinforce democratic control. This can include integrating strategic design teams within Joint Staff organisations to support the civilian leadership directly—thus ensuring that military planning aligns with civilian strategic directives (Lyle, 2019, August 5, p. 11). Furthermore, fostering professional development within MoDs and promoting HR systems that support civilian leadership enhances institutional resilience.

Strengthening the technical capacity of legislative bodies is essential for effective oversight, particularly in complex domains such as defence procurement. Belgian parliamentary oversight, for instance, has shown that institutional mandates alone are insufficient; legislators must possess the technical competence to interpret military information critically. Without parliamentary research services like those in the U.S. or Germany, MPs often rely on external sources—including the media and whistle-blowers—which raises concerns over politicisation and informational asymmetries (Reykers, 2021, p. 521). Legislators must mobilize technical expertise to effectively evaluate and translate

complex military information (Reykers, 2021, p. 521). Strengthening the capacities of parliamentary committees—by, for example, restructuring committees to focus solely on defence—can enhance oversight without necessitating major constitutional reforms (Auerswald et al., 2023, p. 19). Additionally, reinforcing shared norms within the military and maintaining robust civilian institutions are vital for ensuring that political decision-making retains its democratic character (Kenwick, 2020, p. 73).

To further institutionalise democratic norms, governments must also reinforce civil society participation and the independence of the broader defence community—including academics, journalists, and advisers. These actors contribute to pluralistic debates and policy innovation, ensuring that defence affairs do not become monopolised by military or partisan interests (Joó, 1996). Nonetheless, the confidential nature of defence matters often limits transparency. Oversight mechanisms must therefore be carefully designed to balance national security imperatives with democratic accountability, ensuring that secrecy does not become a tool for executive overreach (Reykers, 2021, p. 521).

To further solidify democratic control over defence and security, it is essential to implement integrated solutions that address both structural and operational challenges. Joó (1996) outlines key measures to strengthen civilian control over the military, emphasizing legal clarity, institutional oversight, and professionalized governance. Establishing clear legal and constitutional frameworks ensures adherence to the rule of law and minimizes jurisdictional disputes.

National constitutions, laws, and strategy documents—including Memoranda of Understanding (MOUs) and Letters of Intent (LOIs)—shape the civil-military interface. Within the framework of Total Defence and Host Nation Support, responsibilities are often codified in legal texts, which help coordinate civil and military actors during crises (NATO STO, 2024, May, p. 2-34). Higher-level strategic documents also serve to overcome institutional inertia, offering incentives for collaboration and resource sharing (NATO STO, 2024, May, p. 2-35). However, legal gaps persist—especially regarding civil-military cooperation in development and cyber crisis response—highlighting the need for evolving legal architectures that match emerging threats and operational realities (NATO STO, 2024, May, p. 2-35).

Ultimately, sustaining democratic control over defence and security requires a multifaceted approach: clear legal and constitutional boundaries; capable and well-resourced parliamentary committees; civilian-led strategic planning; and the nurturing of an informed

and independent civil society. Implementation remains context-dependent, requiring continuous adjustment to reflect evolving security landscapes and domestic political cultures (Joó, 1996).

2.2.7 Integrated approaches to national security and military-civilian collaboration

A comprehensive national security strategy must integrate military and civilian resources. Total Defence is a whole-of-society approach designed to deter potential adversaries by increasing the costs of aggression and enhancing national resilience. This concept, prevalent in Nordic countries such as Finland, Sweden, and Norway, involves extensive cooperation among the defence department, other government ministries, civil society organisations (CSOs), and the private sector (NATO STO, 2024, May, p. 2-33). Such integration not only builds societal resilience but also supports territorial defence by ensuring that military actions are backed by widespread civil support.

Legal frameworks play a pivotal role in facilitating cooperation among stakeholders. International treaties (e.g., the Washington Treaty, Lisbon Treaty), declarations, and stand-alone agreements (such as Nordic Defence Cooperation [NORDEFCO]) provide the basis for collaboration. At the national level, legal adjustments—such as those implemented in Lithuania to support Host Nation Support—demonstrate how legislative reform can enhance the operational environment for integrated defence (NATO STO, 2024, May, p. 2-34). Government documents, including national strategy papers, MOUs, and LOIs, further contribute to overcoming organisational barriers by providing clear guidance and fostering incentive-based cooperation (NATO STO, 2024, May, p. 2-35).

Military-civilian collaborative innovation in science and technology (S&T) is another key component of modern defence strategy. Liang et al. (2024, p. 25) recommend several policy measures:

- Subsidy policies: Adopt cost, loan, and capital injection subsidies to incentivize civilian enterprise participation in military-civilian S&T collaborative innovation.
- System strengthening: Enhance information sharing, develop a robust price mechanism for risk sharing, rationalize benefit distribution, and objectively evaluate cooperative outcomes.
- Policy convergence: Improve measures for S&T achievement transformation and intellectual property protection while strengthening policy guidance for high-tech enterprises.

Effective coordination of operations demands clarity regarding the aims and the levels of command required for maximized effect. Egnell (2013, p. 251) argues for a model that achieves strategic integration of civil and military sectors while maintaining separate roles at the operational level. This approach advocates for formalized hierarchical coordination at the tactical level—eschewing ad hoc meetings—in order to ensure unity of command and protect the impartiality and independence of humanitarian operations.

2.2.8 Summary and theoretical implications

This subchapter consolidated key institutional reform pathways into three overarching insights. First, strategic coherence in defence planning depends on doctrinal alignment, effective oversight mechanisms, and a culture of jointness that reduces rivalry. Second, democratic legitimacy requires robust civilian control, transparent budgetary frameworks, and clearly defined roles between political and military leadership. Third, institutional resilience emerges from adaptive governance, cross-domain interoperability, and collaborative frameworks that integrate military and civilian actors in national security strategies. Theoretically, this review reinforces the importance of combining structural reform with cultural transformation, highlighting that enduring progress depends on addressing both formal institutions and informal practices. These conclusions provide the foundation for the comparative analysis developed in the following chapter.

2.3 Institutional and behavioural solutions to dysfunction in defence decision-making

This subchapter reviews scholarly and policy-driven interventions designed to address five recurrent dysfunctions in defence decision-making: personal ambition, cognitive and institutional bias, information manipulation, rent-seeking in procurement, and corruption in opaque, high-stakes environments (see table 3). Rather than recounting the causes of dysfunction—already discussed in the introduction—the review focuses on actionable reforms and behavioural strategies proposed to mitigate these risks. Emphasis is placed on identifying mechanisms that can enhance transparency, accountability, and institutional learning within defence systems. These insights provide the conceptual basis for the subsequent empirical analysis.

2.3.1 Addressing personal ambition and rivalry

Scholars emphasise the importance of fostering interdependence while preserving individual identity in defence organisations. Transformational leadership that supports both skill development and team learning has been shown to improve collaborative creativity and

operational cohesion (Dong et al., 2016; Gu et al., 2016). Fostering psychological safety—where individuals feel secure expressing dissenting views—enhances team functioning, particularly in hierarchical settings such as the military (Edmondson & Lei, 2014, p. 41; Fransen et al., 2020).

Intergroup leadership theory recommends promoting a shared "intergroup relational identity" that values unit distinctiveness while fostering overarching unity (Hogg & Rast, 2022, pp. 567–569; Rast et al., 2018, p. 1100). Managing this "identity paradox" enables alignment between collective goals and individual or service-specific needs (Kourti, 2021).

Narcissistic traits can be channelled positively through role design and reward systems that align personal ambition with institutional objectives (Nevicka et al., 2011, p. 922). Behavioural integrity is strengthened when individuals feel their distinct contributions are recognised within a team framework (Milton, 2015, pp. 50–51). Shared leadership models—where leadership responsibility is distributed—are also associated with greater cohesion and innovation (Fransen et al., 2020; Gu et al., 2016).

Promotion systems require meritocratic evaluation criteria that reward leadership capability, crisis competence, and fairness over sycophancy or proximity to power (Paravantis et al., 2020, pp. 27–29). Inclusive mentorship schemes and structured feedback from subordinates reduce the risk of hierarchical exclusion and reinforce broad-based development (Randolph Jr. & Nisbett, 2019, p. 23). Leadership training should also promote behaviours such as delegation, intellectual stimulation, and encouragement of innovation, empowering teams and valuing junior contributions (Šimanauskienė et al., 2021, p. 13).

Mitigating this dysfunction requires a balance of institutional solutions (e.g., merit-based promotions, formal mentorship systems) and behavioural interventions (e.g., transformational leadership, recognition cultures).

2.3.2 Addressing cognitive and institutional biases

Cognitive biases such as status quo bias, novelty bias, and groupthink distort judgment, often resulting in suboptimal policy and operational outcomes (Acciarini et al., 2021, p. 647; Andersen & Hjortskov, 2016). Strategic decisions often rely on heuristics rather than empirical evidence, with significant consequences for resource allocation and risk assessment. Scholars recommend embedding analytical discipline into institutional routines. This includes training staff in trend detection, strategic foresight, and scenario planning (Acciarini et al., 2021, p. 647), alongside the use of real-time data and predictive modelling to update risk assessments dynamically (Dong et al., 2020).

Organisational diversity also helps counteract groupthink. Including multiple perspectives and allowing dissent within decision-making teams enhances outcome quality (Andersen & Hjortskov, 2016; Deshpande, 2025). Rotating roles, including external experts, and using structured dissent mechanisms (e.g., "devil's advocates") are suggested as safeguards against conformity (Janis, 1982; MacDougall & Baum, 1997, p. 538; Lee et al., 2025, p. 18).

Social identity theory offers additional explanatory value by illustrating how cohesive group dynamics can support or hinder rational judgement. Haslam (2004, p. 232) argues that organisational behaviour is primarily shaped by group processes, not just individual cognition. Strong social identities can promote loyalty, shared purpose, and collective reasoning—counterbalancing competitive individualism and enhancing decision quality. However, as Dashtipour (2015, pp. 83–84) cautions, overly cohesive groups may suppress dissent, masking conformity as consensus. To address this, defence institutions are beginning to institutionalise AI-enabled dissent mechanisms and socially informed leadership practices, including structured feedback loops and anonymous dialogue systems that facilitate critique without undermining authority (e.g. Lee et al., 2025 and Libel, 2025).

Training remains a cornerstone of bias mitigation. Programmes that focus on bias awareness, feedback literacy, and critical reasoning show measurable improvements in decision quality (Chauhan, 2024, p. 11; Maitland & Sammartino, 2015; Fasolo, 2025, p. 2203). Behavioural tools such as scenario-based exercises and digital simulations are recommended for their scalability and long-term efficacy.

Additionally, *choice architecture*—the design of the decision environment—can improve decision outcomes by shaping how choices are presented. Fasolo (2025, pp. 2193–2202) argues that such structural interventions are especially effective during policy execution in routinised environments, whereas debiasing techniques are more useful in early analytical phases. Redesigning workflows to reduce complexity and cognitive overload can result in better performance without requiring behavioural change.

Defence institutions can also address cognitive and institutional distortions by adopting structured analytical reasoning and sensitivity testing. Biases such as overconfidence, naive diversification, and non-linear probability weighting commonly lead to flawed assessments in strategic planning and network defence (Barnes, 1984, pp. 130–133; Woods et al., 2021). These distortions can be countered through deliberative reasoning, critical self-reflection, and access to comprehensive and balanced information (Fischhoff,

1983, pp. 155–156). Subjective sensitivity analysis and routine challenging of assumptions are particularly effective in exposing hidden biases and improving overall judgement quality (Barnes, 1984, p. 135; Fischhoff, 1983, pp. 137–138).

More broadly, defence planning must be understood not only as a technical activity but also as a political and cultural process shaped by historical and institutional norms (Breitenbauch & Jakobsson, 2018, p. 257). Transparency, external peer review, and a commitment to evidence-based methods help ensure objectivity (Breitenbauch & Jakobsson, 2018, p. 259). Still, once organisational narratives are established, they tend to filter subsequent information—reinforcing existing beliefs while dismissing contradictory evidence as unreliable (Barnes, 1984, p. 135). This dynamic highlights the need for institutional mechanisms—such as adversarial analysis and red teaming—to prevent interpretive bias and maintain epistemic vigilance in defence decision-making.

Tackling biases requires structural safeguards (diverse teams, institutionalised dissent, peer review protocols) combined with behavioural strategies (bias-awareness training, leadership encouragement of dissent).

2.3.3 Preventing information manipulation

Information manipulation—by withholding, distorting, or selectively disclosing facts—thrives in environments without relational trust or with ambiguous disclosure norms. Organisational trust, psychological safety, and a clear distinction between acceptable discretion and unethical silence are essential. Psychological safety enables officers to raise concerns or admit mistakes without fear of retaliation (Edmondson & Lei, 2014, p. 40). Leaders must model openness and vulnerability, signalling that dissent is both legitimate and necessary for institutional learning (Detert & Edmondson, 2011, p. 484).

Professionalisation of the procurement workforce plays a crucial role in promoting information accuracy and reducing distortion. Officers equipped with advanced procurement knowledge and ethical training are less likely to withhold or manipulate information under pressure. As Karttunen, Pesu, and Immonen (2025, pp. 10–11) argue, cross-disciplinary and problem-based learning approaches help build critical judgement, enhance ethical awareness, and foster greater accountability in complex procurement environments. Training in ethical communication and feedback literacy is vital. Officers should be equipped to challenge assumptions, regulate emotional responses, and navigate loyalty dilemmas (Brilingaitė et al., 2022, p. 8; Hannah et al., 2011, pp. 571–572). Professional

development should focus not only on technical competence but also on soft skills that promote trust, candour, and team cohesion (Strik, 2023, pp. 17–18, 64).

Institutionally, the introduction of anonymous feedback channels, peer mentoring, and deliberative multi-rank forums can mitigate power asymmetries that discourage open communication. Strik (2023, pp. 146–147) recommends clarifying when limited disclosure is legitimate (e.g., in simulations) versus when transparency is non-negotiable (e.g., strategic planning). Ethical decision-making frameworks and ombuds services further support officers navigating conflicting institutional and interpersonal obligations (Kaptein, 2019, p. 1147).

It is relevant to distinguish between structural measures (professionalisation, ombuds frameworks, anonymous channels) and behavioural levers (trust-building leadership, ethical judgment training) as complementary safeguards.

2.3.4 Combating rent-seeking in procurement

Rent-seeking behaviours in defence procurement—such as demand inflation, collusion, and misaligned incentives—are exacerbated by institutional fragmentation and discretionary authority. Clarifying institutional roles and responsibilities is essential, particularly at the source selection and contract management stages (Mik, 2024, p. 74; Rendon & Rendon, 2016). Structured procurement models like purchasing portfolio frameworks can reduce complexity and identify high-risk transactions (Ekström et al., 2021, p. 10).

Innovation intermediaries also serve as institutional entrepreneurs, bridging coordination gaps, supporting stakeholder integration, and fostering reform (Selviaridis et al., 2023, p. 16). Their role is particularly useful in navigating fragmented ecosystems or legacy organisational structures.

Technological tools further support reform. E-procurement platforms consolidate documentation, standardise workflows, and increase traceability (Bilokin & Kostenko, 2025, p. 400; Jiménez et al., 2022; Organisation for Economic Co-operation and Development [OECD], 2019, pp. 12, 14). Blockchain and AI can detect collusion or pricing anomalies, but must be embedded within coherent legal and regulatory frameworks (Wang et al., 2024, p. 11; Zhu, 2024, p. 23).

A skilled and professional procurement cadre is essential to mitigate rent-seeking behaviour, especially in decentralised or high-discretion environment (Bilokin & Kostenko, 2025, p. 400). Rendon and Rendon (2016) emphasise the importance of targeted training in

fraud detection, contract management, and source selection integrity. Such professionalisation must be embedded in recruitment, career development, and certification standards to be effective.

Contractual design is also key. Rogerson (1994, pp. 78–79) and Fan and Chen (2020, pp. 14–15) recommend incentive-compatible contracts that reward cost-saving behaviour and penalise waste or fraud. Reserve pricing, direct sourcing, and supplier benchmarking reduce pricing power and opportunistic behaviour.

Rent-seeking mitigation requires coupling technological and legal infrastructure with human capital and ethical capability building.

2.3.5 Reducing corruption and strengthening oversight

Reducing corruption in defence procurement requires a systemic and multi-layered strategy combining legal, institutional, and behavioural reforms. Instruments such as ex ante transparency, open contracting, and integrity pacts enhance auditability and deter manipulation (Bauhr et al., 2020; Kohler & Dimancesco, 2020, p. 7; Mik, 2024, p. 75). However, combating grand corruption and clientelism demands more than formal compliance. It involves reclaiming state institutions from entrenched networks, restoring the rule of law, and shifting organisational culture (Dávid-Barrett & Fazekas, 2020, pp. 411–412; Mik, 2024, p. 73).

A consistent action plan must therefore combine preventive and repressive dimensions, leverage synergies across public and private institutions, and ensure the production of timely, qualified, and quantitative information that supports both diagnosis and reporting obligations (Governo de Portugal, Ministério da Justiça, 2020, p. 15). In the defence sector—traditionally secretive and opaque—this means moving beyond measuring corruption itself, which is inherently covert, toward measuring institutional resilience. The Government Defence Integrity Index (GDI) provides the only comprehensive tool to capture institutional controls over corruption in defence, generating data on independence, undue influence, transparency, oversight, and civic space (Transparency International, Defence & Security, 2021, p. 12). Importantly, GDI analysis shows that confidentiality is not a prerequisite for military strength: some of the world's largest defence spenders and exporters also maintain high levels of transparency, illustrating that secrecy is largely a political choice rather than a security necessity (Transparency International, Defence & Security, 2021, p. 8).

Diagnostic tools enhance this systemic approach. Corruption network mapping (Czibik et al., 2021) and Graycar's Slippage Matrix (2019) help visualise institutional vulnerabilities and guide targeted reforms. The Slippage Matrix maps dysfunction across four dimensions—conditions, processes, detection, and prevention—against common failure types such as due process violations, peer culture permissiveness, temptation/easy benefits, and managerial disregard. These diagnostics ensure that reforms target vulnerabilities rather than addressing symptoms superficially.

At the legal and institutional level, frameworks must mandate competitive bidding and allow for risk-based adjustments, while enforcement requires well-resourced, independent oversight bodies (Dávid-Barrett & Fazekas, 2020, p. 415; Prakasa et al., 2022, p. 39). Oversight mechanisms should be integrated, drawing on parliamentary committees, ombuds offices, and audit institutions to close accountability gaps (Heydenrych, 2024, pp. 43–44). Parliamentary bodies require expert capacity to assess complex acquisitions (Reykers & Fonck, 2020, pp. 80–81), while internal agencies must sustain robust audit systems to detect fraud during contract execution (Rendon & Rendon, 2016).

Discretion in procurement remains a key vulnerability. It can be mitigated through e-procurement platforms, procedural clarity, and competitive bidding (Bilokin & Kostenko, 2025, p. 400; Holota, 2019, p. 51). While national security concerns may justify confidentiality, risks are best managed through selective disclosure, independent monitoring, and adoption of NATO/EU best practices tailored to domestic legal systems (Bilokin & Kostenko, 2025, pp. 399–400; Holota, 2019, p. 51).

Judicial capacity is equally vital. Courts must be empowered to review procurement decisions and enforce laws, supported by clear legal mandates and alignment with international standards (Terpan & Saurugger, 2018; Bilokin & Kostenko, 2025, pp. 399–400; Holota, 2019, p. 51). Without such enforcement, even the strongest rules risk remaining symbolic.

At the organisational and cultural level, reform must strengthen professional capacity and ethical leadership. Training in procurement law, fraud prevention, and integrity assurance is indispensable, particularly in early procurement stages (Pyman, 2017; Suardi et al., 2024, p. 21). Pyman (2017) highlights the need for dedicated counter-corruption teams and quantitative Key Performance Indicators (KPI)s to track risks and monitor reform impact. Intelligence-led assessments and financial tracking also expose illicit flows and systemic vulnerabilities (Keene, 2018, p. xiii).

The Norwegian Ministry of Defence (MoD)'s Internal Audit Department offers a practical process model to fight real estate corruption and fraud, which is generalisable to other domains: (1) establish commitment and governing documents; (2) conduct thorough risk assessment; (3) design and implement preventive and detective controls; (4) investigate potential violations and execute corrective actions; and (5) monitor compliance through independent audits and evaluations (Centre for Integrity in the Defence Sector, 2017, pp. 3, 24). Such structured processes illustrate how internal audits can only succeed when auditors combine technical expertise with strong moral courage and the ability to challenge decision-makers effectively.

Finally, corruption control is strongest when institutional oversight frameworks are reinforced by ethical leadership, continuous risk monitoring, and an accountability culture. As Transparency International stresses, reforms that address only the technical side of procurement remain insufficient; unless systemic corruption is tackled through transparency, accountability, and cultural change, military effectiveness and security credibility will remain compromised (Transparency International, Defence & Security, 2021, p. 12).

In sum, reducing corruption in defence acquisition requires coordinated reforms that align legal authority, oversight capacity, and institutional culture. A systemic approach—diagnostic, preventive, and repressive—ensures transparency, limits discretion, empowers judicial enforcement, and professionalises procurement governance, while embedding ethical leadership and resilience against entrenched networks.

2.3.6 Synthesis and analytical framework for case study comparison

This literature review has examined both institutional (structural) reforms and behavioural (leadership and cultural) interventions designed to address five recurrent dysfunctions in defence decision-making: personal ambition and rivalry, cognitive and institutional bias, information manipulation, rent-seeking, and corruption.

The evidence suggests that effective and sustainable reform requires a dual-track approach. Structural measures—such as legal frameworks, oversight mechanisms, and digital traceability tools—establish the formal rules of the game, while behavioural interventions—such as leadership practices, training, and cultural change—shape how those rules are understood and enacted in daily operations. Institutional solutions without behavioural change risk "paper compliance," whereas behavioural reforms without structural backing tend to fade when leadership or political priorities shift.

Across all categories, the most successful interventions were integrated strategies that combined:

- Legal and regulatory clarity to limit discretionary authority.
- Professionalisation and capacity-building to strengthen technical competence and ethical norms.
- Digital and analytical tools to enhance transparency and detect irregularities.
- Leadership incentives and cultural reforms to sustain openness, trust, and mission focus.

These findings not only provide a conceptual basis for the empirical case studies in the next subchapter but also highlight diagnostic indicators and reform pathways that can be used to systematically evaluate procurement outcomes across diverse institutional settings.

To facilitate consistent cross-case comparison, table 5 presents an Analytical Framework that distinguishes Institutional/Structural solutions from Behavioural/Leadership Interventions for each type of dysfunction. This separation allows researchers to identify whether shortcomings in procurement outcomes stem primarily from weaknesses in formal structures, from entrenched norms and informal practices, or from a mismatch between the two.

Table 5 – Analytical framework for assessing dysfunction and reform in defence procurement

Dysfunction	Diagnostic Indicators	Institutional/ Structural Solutions	Behavioural/ Leadership Interventions	Lessons for Transparency, Accountability, and Effectiveness
Personal Ambition & Rivalry	- Sycophancy - Hierarchical exclusion - Lack of team cohesion	- Meritocratic promotion - Structured feedback mechanisms - Formal mentorship & evaluation systems	- Transformational/ shared leadership - Fostering psychological safety - Recognition of individual/team contributions	- Combine formal and informal recognition - Leadership incentives sustain team innovation and cohesion
Cognitive & Institutional Bias	- Groupthink - Status quo/novelty bias - Heuristic overreliance	- Team diversity mandates - Rotating/external expert roles - Institutionalized dissent mechanisms (e.g., “devil’s advocate”) - Peer review routines	- Bias-awareness & critical reasoning training - Scenario exercises - Leadership promoting openness - Encouraging feedback literacy	- Embedding analytical routines and diversity enhances decision robustness - Both structural routines and cultural openness are critical
Information Manipulation	- Withholding / distortion	- Anonymous feedback channels	- Training in candour/ ethical judgment	- Trust and transparency

	- Fear of reprisal - Unclear boundaries	- Ethics/ procurement professionalization - Ombuds & peer forums	- Leaders modelling openness & vulnerability - Building trust-based climate	mechanisms deter manipulation - Clear disclosure norms and leadership behaviour reinforce learning
Rent-Seeking	- Demand inflation - Collusive behaviour - Opacity, price anomalies	- Role/incentive clarification - E-procurement, blockchain, audit tools - Contract benchmarking	- Training in procurement integrity/ fraud detection - Professionalization of procurement cadre - Soft skills: negotiation, ethics	- Traceability and integrity systems deter abuse - Professional and ethical development aligns conduct and outcomes
Corruption	- Lack of oversight - Opaque/ admin discretion - Weak enforcement	- Open contracting & ex ante transparency - Integrated/ independent audit & oversight - Legal/judicial empowerment	- Training in integrity and oversight - Leadership accountability - Culture of ethical compliance & risk monitoring	- Integrated oversight/transparent procedures limit discretion - Ethical leadership and monitoring raise institutional resilience

In chapter 4, four empirical case studies were examined to test the applicability and limitations of these solutions in diverse national and institutional contexts.

2.4 Competitive defence strategy in modern warfare

In contemporary defence planning, strategic competition unfolds within environments characterised by volatility, complexity, uncertainty, and systemic interdependence. These environments behave as complex adaptive systems, where actors, institutions, and outcomes are interlinked through dynamic, nonlinear interactions. Traditional linear models of strategy have diminishing relevance, as military and political actors must operate within fluctuating equilibria, shifting alliances, and rapid technological transformation.

This subchapter explores the theoretical and operational implications of strategic competition in such systems, examining how defence organisations can develop competitive strategies, build internal adaptability, and maintain organisational effectiveness. By integrating systems theory, strategic management, and defence studies, it advances a structured approach to resilience, adaptability, and foresight in national defence institutions.

2.4.1 Strategic competition and competitive strategies

Complex, adaptive systems are marked by dense interconnections that allow for multidirectional flows of energy and information. These interconnections support diverse interactions and allow agents to act as “network entrepreneurs” by forging new ties and reshaping relational structures (Hill & Watson, 2019, pp. 15–16). Within such systems,

strategic competition occurs in environments defined by dynamism, unpredictability, and temporary equilibria. Competitive positions can shift suddenly, with no permanent winners, as victories remain inherently transient (Hill & Watson, 2019, p. 16).

These systems resist centralised control. Critical behaviours often lie beyond the influence of any single actor, and attempts to impose order yield inconsistent results. The strategic competition that takes place within them is equally fluid: adversaries may become allies and vice versa. Participation is voluntary; actors may exit, return, or shift from competition to cooperation. A notable example is the U.S.' withdrawal from international affairs after World War I and its re-engagement during World War II (Hill & Watson, 2019, p. 23).

Organisational effectiveness is defined by the long-term viability and adaptability of an institution. It depends on the ability to navigate external environments, secure critical resources, and maintain internal efficiency. Strategic leaders influence performance through decisions related to competitive strategy, human capital, organisational design, and innovation (Yukl, 2013, pp. 277–279).

Competitive strategy plays a decisive role in ensuring organisational survival and financial performance. It involves positioning the organisation to deliver value—whether through cost, quality, uniqueness, or patriotism—and adapting to environmental signals, innovations, and resource availability. Leaders must scan the environment, identify core competencies, and craft adaptive strategies that shape other performance dimensions (Yukl, 2013, pp. 278–279).

According to Porter (1998, pp. 35–41), sustainable competitive advantage arises from:

- Cost Leadership – minimising operational costs via scale, technology, or resource access.
- Differentiation – offering unique attributes that allow price premiums.
- Focus Strategy – targeting niche markets through cost or differentiation.

Sustained success requires consistent commitment to a chosen strategic path.

Efficiency—optimal use of resources to reduce costs and waste—is especially critical during financial constraints. Enhancing it may involve redesigning processes, adopting technology, or improving coordination. Process reliability ensures safety, quality, and timeliness and can be supported by tools like Six Sigma or re-engineering (Yukl, 2013, pp. 277–278).

Human capital is a foundational asset, particularly in knowledge-intensive environments. Performance hinges on skills, motivation, and social capital. Effective policies in recruitment, training, compensation, and succession planning are key to sustaining high-performing teams (Yukl, 2013, p. 278).

For an organisation to transition towards its envisioned future, formal and informal elements must be aligned. Formal alignment involves defining clear objectives, concepts, and means. Objectives must be specific, measurable, achievable, relevant, and time-bound (Centre for Army Leadership, n.d., pp. 26–27). Organisational means include technology, structure, human capital, information, and reputation (Hill & Watson, 2019, pp. 15–16; Martinez & Galvin, 2019, p. 9). Externally, leaders must influence stakeholders and direct resources to pursue the vision and manage environmental uncertainty (Martinez & Galvin, 2019, p. 9; Yukl, 2013, pp. 278–279).

Informal facilitation relates to fostering a culture of adaptation and innovation. Leaders shape this through the values they emphasise, the behaviours they reward, and their support for initiatives such as training, transparent communication, and creative thinking (Martinez & Galvin, 2019, p. 10; Yukl, 2013, p. 281).

Table 6 synthetizes this structured approach.

Table 6 – A structured approach for strategic competition in complex adaptive systems

Phase	Strategic focus	Key dimensions	Operational guidance
1. System Comprehension	Understand the nature of the strategic environment	Nonlinear interdependencies; multidirectional information flows; temporary equilibria and shifting alliances	Map dense interconnections and identify "network entrepreneurs." Recognise the fluidity of actor roles and relationships. Avoid rigid assumptions.
2. Strategic Positioning	Identify sustainable competitive advantage	Cost leadership; differentiation; focus strategy; environmental responsiveness	Choose a clear competitive path. Tailor value propositions to context. Maintain agility to reposition as conditions evolve.
3. Organisational Design	Align internal structure with strategic goals	Formal/informal coherence; objectives, concepts, and means; resource configuration	Ensure that formal structures (technology, personnel, reputation) and informal culture support the chosen strategy.
4. Human Capital Development	Build and sustain critical capabilities	Skills and competencies; motivation and leadership; succession and retention	Invest in recruitment, training, and development. Foster knowledge sharing and adaptive leadership.
5. Strategic Integration and Execution	Implement competitive strategies across domains	Environmental scanning; cross-functional alignment; stakeholder influence	Translate strategy into action through integrated campaigns. Influence external actors and reallocate resources as needed.
6. Performance Management	Ensure organisational effectiveness and resilience	Process efficiency; innovation and adaptability; risk mitigation	Apply methods like Six Sigma or re-engineering to improve reliability. Innovate to stay ahead in the competition. Monitor and manage internal risks.

2.4.2 Strategic defence and organisational adaptation in a competitive security environment

2.4.2.1 Purpose and scope

National security is a fundamental objective of all political communities; national defence comprises the measures adopted to safeguard that objective (Collins, 2002, p. 8; Santos, 2000, p. 81). The military dimension of national defence—commonly termed "defence" in Anglo-Saxon usage—is central to state and human security. Historical failures in this domain (for example, ineffective border control, unsuccessful foreign interventions, or military coups) have produced severe civilian consequences (Transparency International Defence & Security, 2021, p. 8). Consequently, defence policy must transcend narrow military considerations and integrate political, economic, technical and military perspectives into a coherent, adaptable strategic vision (Enthoven & Smith, 2005, p. 84).

2.4.2.2 Foundations of strategic planning and legitimacy

Effective defence planning aligns objectives, resources and anticipated threats to ensure forces that are suitable, adaptable and ready (Collins, 2002, p. 8; Gray, 2014, pp. 4, 155). Strategic breadth—the incorporation of political aims, plausible threat scenarios and long-term geostrategic foresight—must override narrow tactical preoccupations (Collins, 2002, p. 291). Cost-effectiveness and public legitimacy are essential to sustain democratic support for defence expenditure and operations (Collins, 2002, p. 8; House of Commons Defence Committee, 2022, pp. 13, 24; Sempere, 2023, p. 98). Public legitimacy depends in large part on clear articulation of national interests: cases such as the Cuban Missile Crisis (with strong public support) contrast with the Korean War (less popular), underscoring the political weight of transparent strategic communication (Collins, 2002, p. 15).

Simon (1997, pp. 291–292) recommends robust, continuous strategic assessment at the highest policy levels so that diverse priorities are balanced and emergent risks are recognised and managed without strategic overreach. In a similar vein, ministries must institutionalise reassessment mechanisms to avoid complacency and to ensure that planning assumptions remain current (Hill & Watson, 2019, p. 24; House of Commons Defence Committee, 2015, p. 3).

The competitive environment in which defence policy operates is constantly evolving—shaped both by environmental changes and by the decisions of relevant actors. What is deemed legitimate or acceptable in competition is frequently redefined, as illustrated

by normative shifts driven by agreements like the Geneva Conventions. Accordingly, strategic flexibility and continual reassessment are indispensable. Simultaneously, governments must avoid the temptation to downplay emergent geopolitical risks, remaining prepared to respond decisively (House of Commons Defence Committee, 2022, p. 11).

2.4.2.3 Capability alignment and acquisition assumptions

Military strategy serves as the principal mechanism through which political mandates are translated into operational capabilities (Couto, 1988, p. 228). This requires aligning present and future military capacities with projected threats (Keupp, 2021, p. 69). Because technological change increasingly blurs service boundaries, capability requirements for a mission should drive acquisition and design rather than single-Service preferences. In this context, Enthoven and Smith (2005, pp. 105–108) argue that planners must concentrate on Defence establishment needs when creating major systems and that multiple, equally defensible sets of assumptions may exist for any proposed weapon system; failure to compare alternative assumptions risks capture by service preferences and suboptimal choices. Future conflicts will differ substantially from past wars; methodical analysis is therefore critical to understand how changes in conflict character affect weapon selection and strategy (Enthoven & Smith, 2005, p. 106).

Medium and small powers, recognising resource limits, should privilege highly skilled, well-equipped forces structured for coalition operations and territorial defence rather than unsustainable attempts to field comprehensive capabilities (Elliott, 2015, p. 238). Defence planning must also account for the likelihood and consequences of various threats. While frequent threats such as insurgency demand numerous personnel, rare but critical confrontations between state actors necessitate advanced technologies and economic resilience. The appropriate balance depends on national objectives, resources, and alliance commitments. A mismatch between strategic goals and military means risks failure or stalemate (Elliott, 2015, pp. 236–237).

2.4.2.4 Threat environment and competitive strategies

Adapting to competitive strategic environments entails more than static planning—it requires continuous strategic evolution to anticipate and counter adaptive adversaries (Hill & Watson, 2019, p. 13). Military threats are multidimensional, varying in scale, intensity, domain, and actor. Effective threat prioritisation involves assessing both enemy capabilities and probable courses of action, focusing resources on the most imminent and significant risks (Collins, 2002, p. 15).

Contemporary competitors often seek strategic advantage below the threshold of open war, employing diplomacy, economic coercion, subversion, disinformation and disruptive technologies (cyber tools, AI, hypersonics) to "win without fighting," while also maintaining capacity for high-intensity conflict when required (JCS, 2023, February 10, pp. 5–6). Therefore, states must combine deterrence with integrated competitive strategies that exploit diplomatic, informational, military and economic instruments (DIME) coherently, and that leverage alliances and interagency cooperation (JCS, 2023, February 10, pp. 27–29).

The Joint Concept for Competing prescribes a systematic process for competition: problem characterisation, actor mapping, environment analysis, disaggregation into sub-areas aligned to instruments of national power, assessment of ongoing activity, development and comparison of alternative strategies, and integration into an overarching competitive plan (JCS, 2023, February 10, pp. 42–55). Nevertheless, the Concept has a recognised shortfall: it lacks practicable short-term implementation mechanisms and offers limited guidance on near-term operationalisation (JCS, 2023, February 10, pp. 56–63).

2.4.2.5 Organisational transformation and leadership

Defence organisations must transform continuously in response to political, technological, economic and environmental change. Transformation requires clear urgency, capable leadership teams, a coherent vision, empowerment of actors, short-term wins and institutionalisation of new practices (Kotter, 2007, p. 4). Leaders in defence, as pivotal change agents, must combine technical competence, managerial skill and political acumen to translate strategic intent into organisational practice (Defence Force Ireland, 2016, p. xi). Building new concepts and capabilities thus implies cultural and behavioural change at the personal, organisational and institutional levels; leadership development and management capacity are essential to effect and sustain these changes (Galvin, 2018, p. 12).

To mitigate institutional bias in capability decisions, defence organisations should employ structured, multi-dimensional decision matrices that explicitly surface trade-offs across four key axes (Bland, 1999, p. 11): strategic — the alignment of ends and means; organisational — the allocation of resources and definition of internal roles; social — the management of civil–military relations; and operational — the employment and use of forces.

Strategic leadership must navigate a paradox: while routinised practices promote efficiency, they can hinder adaptability. Organisational success may breed complacency, weakening response capacity in changing environments. Leaders must simultaneously

maintain internal efficiencies and invest in external situational awareness, recognising that core assumptions may quickly become obsolete (Hill & Watson, 2019, p. 24). For this reason, MoDs must establish reliable information systems, efficient organisational processes, and inclusive decision-making frameworks (House of Commons Defence Committee, 2015, p. 3).

2.4.2.6 Performance measurement and efficiency

Organisational effectiveness comprises adequacy (goal attainment) and efficiency (resource use)—two distinct metrics that must be evaluated independently (Simon, 1997, p. 290). Military organisations can improve resource utilisation by applying rigorous performance measurement systems (Taylorism-inspired) that standardise inputs and outputs and establish benchmarks. Although not all military outputs admit straightforward monetary valuation, efficiency can be assessed using time-use, personnel deployment and relative cost structures (Keupp, 2021, p. 94). Advanced data analytics, time-based metrics, standardised process measures and refined cost accounting, coupled with budgetary incentives that recycle savings into capability improvement, create sustainable incentives for efficiency (Keupp, 2021, pp. 94–96).

2.4.2.7 Resilience, systems-of-systems and industrial foundations

The war in Ukraine illustrates that military power rests not only on weapon systems and plans but also on organisational structure, morale and the strength of industrial and economic foundations (O'Brien, 2023). Strategic success depends on sustained logistics, industrial capacity and economic resilience; absent these, even well-equipped forces may fail. National resilience therefore functions as strategic deterrent: resilient civilian infrastructure and cohesive societies reduce the attractiveness of aggression and raise its costs (O'Brien, 2023).

Resilience is a dynamic, adaptive process; planners must account for complex interactions among systems-of-systems, discrete systems and non-systems, accepting necessary trade-offs and investments (Keenan et al., 2024, p. 511). NATO's resilience assessment identifies seven requirements—continuity of government and critical services; resilient energy supplies; management of uncontrolled population movements; resilient food and water; mass-casualty capacity; resilient communications; and resilient transportation systems (Shea, 2016). Policy actions to enhance resilience include improved cyber resilience, hybrid-threat strategies, adaptation of territorial defence mechanisms, and deeper cooperation with the EU and partner states (Shea, 2016).

2.4.2.8 Innovation, multi-domain operations and NATO imperatives

Innovation can be usefully categorised as strategic (grand strategy reconfiguration), defence (conversion of ideas into products/processes with military or dual use) and military (improvements to force preparation and conduct of war) (Cheung et al., 2011). NATO's Warfighting Capstone Concept articulates five Warfare Development Imperatives—Cognitive Superiority, Layered Resilience, Influence and Power Projection, Cross-Domain Command, and Integrated Multi-Domain Defence—and six strategic "outs" to retain advantage (out-think, out-excel, out-fight, out-pace, out-partner, out-last) (NATO Allied Commander Transformation [ACT], 2023, December 22). These frameworks underscore that technological and organisational innovation must be purposefully aligned to strategy, doctrine and force design.

Anticipating and adapting to military revolutions—discontinuous changes in the character of warfare, often technology driven—provides decisive strategic advantage (Krepinevich, 2023, p. 1).

2.4.2.9 Institutional implementation and governance

To ensure national interest supersedes parochial organisational preferences, policymakers must foster debate, commission comparative studies, demand alternatives and make evidence-based decisions (Enthoven & Smith, 2005, p. 71). Chiefs of defence should have constitutional responsibilities to maintain war preparations and to resist institutional conformity that impedes critical scrutiny (Elliott, 2015, p. 230). Practical bridging mechanisms are required to translate strategy into programming and budgeting decisions: pilot programmes, rapid prototyping and demonstrators can provide near-term lessons to inform longer-term programmes (JCS, 2023, February 10, pp. 56–63).

2.4.2.10 Conclusions

Strategic defence in a competitive security environment demands integrated planning, constant reassessment of assumptions, organisational adaptation, leadership investment and resilient economic and industrial foundations. Success depends on aligning capability development to mission needs rather than institutional preferences, institutionalising cross-service assessment of acquisition assumptions, and implementing measurable resilience and efficiency metrics.

The preceding subsections (2.4.2.1–2.4.2.9) have explored the diverse requirements of strategic defence and organisational adaptation, including foundations of legitimacy, capability development, leadership transformation, resilience, and performance evaluation.

These elements, while analytically distinct, are mutually reinforcing and require integration into a coherent framework to guide decision-making. To consolidate these insights, table 7 synthesises the principal phases, strategic foci, key dimensions, and operational guidance that underpin adaptive defence planning in a competitive security environment.

Table 7 – Phases of strategic defence and organisational adaptation in a competitive security environment: synthesis of key dimensions and operational guidance

Phase	Strategic focus	Key dimensions	Operational guidance
1. Strategic Assessment	Ensure coherence between ends, ways, and means	Strategic alignment; threat anticipation; strategic thinking; continuous assessment mechanisms	Conduct scenario-based planning and cross-domain threat assessments aligned with national and alliance goals; establish ongoing high-level review processes to balance priorities and adjust for emergent risks.
2. Competitive Positioning	Compete effectively in multi-domain and sub-threshold arenas	Strategic competition; integrated national power; coalition readiness; sub-threshold competition	Implement whole-of-government strategies; coordinate across diplomatic, informational, military, and economic tools; prioritise targeted capabilities for coalition and multi-domain operations.
3. Organisational Transformation	Maintain institutional relevance through adaptation	Organisational change; innovation; institutional effectiveness; change management processes	Apply transformative leadership principles (urgency, vision, quick wins); institutionalise innovation mechanisms; review and adapt defence structures regularly to preserve agility.
4. Capability Development	Anticipate future threats and disruptions	Military innovation; technological adaptation; resource optimisation; R&D foresight	Develop R&D strategies for future operational challenges; enhance acquisition agility; align capabilities with threat evolution and operational demands.
5. Resilience Building	Ensure continuity, deterrence, and national endurance	Societal resilience; layered defence; deterrent posture; critical infrastructure (CI) resilience	Strengthen civil-military interfaces; implement NATO's seven resilience baselines; invest in adaptable CI and defence logistics.
6. Adaptive Leadership	Navigate uncertainty and maintain strategic agility	Leadership under complexity; strategic agility; institutional learning; stakeholder influence	Promote cognitive flexibility and situational awareness among leaders; embed continuous learning loops; balance routine efficiency with adaptability; foster a culture of innovation and accountability.
7. Performance Evaluation and Organisational Efficiency	Improve strategic effectiveness organisational efficiency, accountability, and institutional legitimacy	Strategic adequacy; organisational efficiency; performance measurement; governance legitimacy; public trust; resource optimisation	Employ independent audits and evidence-based assessments to evaluate strategic effectiveness and resource efficiency; use performance indicators, data analytics, benchmarking, and continuous feedback mechanisms while ensuring transparency, oversight, stakeholder inclusion, and reinvestment of efficiency gains into capability development.

The framework presented in table 7 suggests that strategic defence is not a linear or finite process but a cyclical and adaptive one. Progression from assessment through competitive positioning, transformation, capability development, resilience, leadership, and performance evaluation reflects the interdependence of these dimensions. In practice, states and defence organisations must cycle repeatedly through these phases, updating assumptions and recalibrating objectives in response to dynamic threat environments. This systemic approach ensures that defence planning is simultaneously anticipatory, adaptive, and accountable, thereby positioning institutions to sustain competitive advantage and safeguard national interests in an increasingly contested global order.

2.4.3 Conceptual discussion: integrating strategic competition and organisational adaptation in defence planning

Tables 6 and 7 reflect complementary perspectives on strategic management within defence organisations operating in complex adaptive systems. Table 6 provides a structured approach to strategic competition, emphasising systemic coherence, nonlinear interdependencies, and the dynamic management of performance. Table 7, in turn, elaborates a framework for organisational adaptation in a competitive security environment, embedding defence-specific dimensions such as multi-domain competition, military innovation, civil–military resilience, and legitimacy.

Despite their different emphases, both frameworks converge on the recognition that defence organisations are adaptive systems, embedded in VUCA environments. Their effectiveness depends not on static efficiency but on their ability to combine strategic foresight, organisational coherence, and continuous learning in order to sustain advantage against adaptive adversaries.

Several substantive commonalities emerge:

- Contextual understanding as a point of departure. Both frameworks begin with situational awareness—whether described as System Comprehension (table 6) or Strategic Assessment (table 7). This phase emphasises the anticipation of threats, the mapping of interdependencies, and the need for continuous reassessment as the environment evolves.
- Strategic positioning at the core. Each framework identifies positioning as central: table 6 frames this as competitive strategy (cost, differentiation, or focus), while table 7 translates it into the defence-specific domain of multi-

domain and sub-threshold competition, supported by whole-of-government and coalition approaches.

- Human capital and leadership as enablers. Both highlight the central role of leadership, institutional learning, and cognitive adaptability. Leadership under complexity supports not only organisational agility but also innovation, accountability, and legitimacy in decision-making.
- Organisational design and transformation as the backbone. Whether captured as Organisational Adaptation (table 6) or Organisational Transformation (table 7), structural alignment and change management processes form the operational foundation of adaptation. Without coherent institutions, strategies cannot be effectively implemented.
- Capability and innovation development as anticipatory measures. Both frameworks stress that preparing for disruptive threats requires forward-looking investment in technology, R&D, and procurement agility. In defence contexts, this includes explicit foresight for disruptive technologies, as well as the integration of coalition and alliance requirements.
- Resilience and continuity as safeguards. While framed differently—system resilience in table 6 and layered societal/military resilience in table 7—both converge on the importance of endurance, deterrence credibility, and protection of CI and supply chains.
- Performance review as closure and renewal. Each framework concludes with evaluation: Performance Management (table 6) or Performance Evaluation (table 7). Both emphasise not only measuring effectiveness and efficiency but also maintaining legitimacy, transparency, and public support. Table 7 adds efficiency systems and incentivisation, recognising the role of accountability in sustaining reform momentum.

Taken together, the two frameworks reinforce each other. Table 6 supplies a general strategic logic, grounded in systems thinking and competitive positioning, while table 7 contextualises this logic within defence realities, highlighting multi-domain competition, resilience, and legitimacy. Their integration (table 8) therefore produces a coherent framework for defence organisations, capable of navigating complexity by combining foresight, adaptability, and accountability.

Table 8 – Integrated framework for strategic defence in complex adaptive environments

Phase	Strategic focus	Key dimensions	Operational guidance
1. Strategic comprehension	Understand the strategic environment and align goals	Nonlinear interdependencies; strategic alignment; threat anticipation; continuous assessment mechanisms	Map interconnections across security domains; apply scenario-based planning; establish ongoing review processes to balance priorities and adjust for emergent risks; align national and alliance goals to avoid overreach.
2. Competitive positioning	Establish and sustain advantage in strategic competition	Cost/differentiation/focus strategies; integrated national power; coalition readiness; sub-threshold/hybrid competition	Choose a clear competitive path; integrate diplomatic, informational, military, and economic tools; maintain agility to reposition as conditions evolve; prioritise tailored capabilities for coalition and below-threshold missions.
3. Organisational adaptation	Align structure and processes with strategic imperatives	Formal/informal coherence; organisational transformation; institutional effectiveness; change management processes	Ensure structures support strategic goals; apply transformative leadership principles (urgency, vision, quick wins); institutionalise innovation and review processes for continuous adaptation.
4. Capability and innovation development	Prepare for future operational and technological demands	R&D and military innovation; acquisition agility; resource optimisation; foresight for disruptive technologies	Invest in emerging technologies (cyber, AI, hypersonics, etc.); develop agile procurement mechanisms; align capabilities with evolving threats and coalition operational needs.
5. Resilience and continuity	Ensure endurance under disruption and sustain deterrence	Societal resilience; layered defence; risk mitigation; CI and cyber resilience	Strengthen civil-military integration; implement NATO's seven resilience baselines; invest in adaptive infrastructure, cyber defence, and robust logistics to sustain endurance.
6. Leadership and human capital	Cultivate agile leadership and institutional learning	Strategic agility; competencies and succession; stakeholder influence; culture of innovation and accountability	Promote cognitive flexibility and adaptive leadership; invest in talent development and succession planning; embed learning loops; reinforce transparency and collaborative culture.
7. Performance and strategic learning	Evaluate strategic effectiveness, organisational efficiency, and institutional legitimacy	Strategic adequacy; organisational efficiency; performance measurement; governance legitimacy; transparency and public trust; institutional learning and incentivisation	Conduct independent audits and evidence-based assessments to evaluate both strategic goal attainment and resource efficiency; apply quantitative and qualitative performance indicators (time utilisation, personnel allocation, operational outputs, and cost structures); integrate data analytics, benchmarking, and continuous feedback mechanisms to support adaptive learning, transparency, stakeholder oversight, and capability improvement.

Within this thesis, the term *competitive defence* denotes an institutional posture that emphasises both strategic advantage and institutional resilience. Put succinctly:

Competitive defence (short definition): A coordinated institutional posture that (1) aligns political, informational, economic and military instruments to preserve strategic

advantage; (2) continuously senses and adapts to threats and technological change through modular capability planning and iterative learning; and (3) embeds transparent accountability and anti-capture safeguards to deter corruption, rent-seeking and factional capture.

This concise definition provides the conceptual anchor used throughout the thesis. The full, operational definition — including its implications for organisational design and measurement — is presented in subchapter 5.4 (see also the operationalised table 8 [table 19] and the indicator codebook in appendix A).

3. Methodology

This chapter outlines the methodological design of the thesis, explaining how the RQs and specific objectives are addressed through a combination of qualitative approaches. Given the complexity of defence institutions and the multidimensional nature of competitiveness, a single-method design would be insufficient. Instead, the study employs a multi-layered strategy that integrates conceptual synthesis, realist evaluation, and comparative case study analysis, supported by cross-cutting principles of qualitative research. The chapter is organised into five main parts. It begins by presenting the overall research design and philosophical orientation (subchapter 3.1), followed by a discussion of data collection strategies and source triangulation (subchapter 3.2). Subchapter 3.3 explains how each specific research objective is operationalised through tailored methodological tools: case study validation for uncertainty, realist evaluation for institutional barriers, and comparative case analysis for behavioural dysfunctions. Subchapter 3.4 elaborates on issues of validity, reliability, and methodological limitations, while subchapter 3.5 reflects on ethical considerations. Together, these elements provide methodological coherence, ensuring that the study is both theoretically informed and empirically grounded. By combining different modes of reasoning—deductive, inductive, and abductive—the design allows for the development, testing, and refinement of the competitive defence framework. This integrative approach not only strengthens internal validity but also enhances the external relevance of the findings for both academic and policy communities.

3.1 Research design and methodological orientation

This study employs a unified qualitative methodology to address the general RQ and its three subordinate RQs. The overall aim is to explore how national defence organisations can strengthen institutional competitiveness under conditions of uncertainty, complexity, and resource constraints.

Given the multidimensional nature of the research problem, the study is both analytical and exploratory. It does not attempt to test hypotheses or measure causal effects through statistical inference; rather, it develops and applies conceptual and empirical frameworks to improve understanding of how defence planning can adapt to persistent strategic disruption (Meadows, 2008/2009, pp. 175–176, 183; Mintzberg, 1994).

The research strategy is grounded in a predominantly qualitative design, employing interpretive methods that enable systematic and context-sensitive analysis of institutions, strategic frameworks, and reform processes. A structured multi-stage analytical procedure

guides the study, whereby primary and secondary sources, official policy documents, and scholarly literature are synthesised to construct theoretically informed conceptual models (Saldaña, 2009, pp. 163–164), which are subsequently validated through comparison with documented institutional practices.

A common epistemological orientation underpins all three RQs as well as the overarching general RQ. The study is guided by an interpretivist stance with realist elements, recognising that institutional phenomena must be understood within their specific contexts, while also enabling the identification of recurring patterns and underlying mechanisms (Pawson & Manzano-Santaella, 2012, p. 181, Yanow, 2000, pp. 6, 10).

3.1.1 Justification of the research design

The research design is structured to balance conceptual innovation with applied institutional relevance. It employs qualitative methods that facilitate the examination of abstract theoretical principles while anchoring them in empirically observable institutional practices. The use of case studies provides contextual depth and enables theory-informed exploration of reform dynamics within defence organisations (Yin, 2018, p. 50; George & Bennett, 2005).

This approach is particularly well suited to defence and security studies, where access to primary data is often constrained by classification, confidentiality, and operational sensitivity (Gill & Phythian, 2018). Consequently, much of the empirical foundation must be constructed from publicly available sources, grey literature, and institutional documentation, which, while imperfect, provide a sufficiently robust evidentiary base when triangulated systematically (Yin, 2018, p. 197).

Furthermore, the chosen design prioritises the development of actionable and context-sensitive analytical frameworks over the pursuit of universal theories, thereby aligning with the applied orientation of strategic and institutional research (George & Bennett, 2005; Flyvbjerg, 2006, pp. 224–225).

3.1.2 Methodological integration across study objectives

In addition to addressing the three specific study objectives through case-based and realist-informed qualitative methods, the study also responds to the primary study objective, which seeks to articulate a comprehensive framework for competitive defence planning.

This requires a distinct yet integrated methodological approach that combines empirical insight with theoretical abstraction. Accordingly, the study adopts a conceptual synthesis strategy in its final analytical phase. This approach draws from the literature on

complex adaptive systems, organisational theory, strategic management, and defence planning to construct a framework for strategic defence adaptation.

The synthesis reflects an abductive mode of reasoning, whereby empirical patterns identified through case analysis are iteratively aligned with theoretical constructs, enabling the development of a system-level model for improving defence competitiveness under uncertainty (Beach & Pedersen, 2019, pp. 173, 269, 277–278; Meadows, 2008/2009, pp. 11–14; Mintzberg, 1994; Yin, 2018, p. 251). The conceptual synthesis approach is particularly relevant to the general RQ, which is not amenable to direct empirical testing but instead requires the integration of insights from multiple theoretical traditions.

3.2 Data collection techniques and selection criteria

The study relies on documentary analysis as the principal mode of data collection, consistent with qualitative research traditions where access to sensitive domains, such as defence and security, is constrained (Gill & Phythian, 2018). Sources are systematically examined, with attention to triangulation, credibility, and traceability.

3.2.1 Primary data sources

Primary data consists of original and authoritative documents that reflect institutional positions, policies, and practices. These include:

- Official publications from MoDs, NATO, the EU, and other multilateral institutions.
- Government documents and legal texts, such as white papers, defence reviews, procurement legislation, and strategic doctrines.
- Reports from parliamentary committees, audit agencies, and oversight bodies (e.g., Transparency International, OECD, SIGMA).
- Public speeches, communiqués, and interviews with senior officials, analysed as direct expressions of institutional intent or policy framing.
- Official statistical data and online resources, including datasets and repositories from governmental or NATO sources.

The study deliberately forgoes interviews or surveys, for three reasons: (1) the sensitivity of defence-related information and restrictions posed by classification protocols; (2) the research focus on institutional and strategic practices already documented in the public domain; and (3) the commitment to methodological transparency and replicability, which is enhanced by reliance on verifiable, publicly accessible sources.

3.2.2 Secondary data sources

Secondary data provides contextual depth and interpretive perspectives that complement primary sources. These include:

- Peer-reviewed academic literature in political science, defence studies, public administration, and organisational theory;
- Scholarly monographs and edited volumes addressing defence reform, strategic planning, and institutional change.
- Policy analyses and reports from reputable think tanks (e.g., Research and Development [RAND], Chatham House, Carnegie).
- Investigative journalism and specialised defence media, used selectively for empirical illustration and contextualisation.

Secondary sources are used primarily for theoretical framing, comparative insights, and critical assessments of primary material.

3.2.3 Selection and triangulation

Document selection followed explicit criteria:

- Relevance: sources must directly address the RQs or illustrate mechanisms of defence reform.
- Credibility: priority is given to institutional, peer-reviewed, and established policy sources.
- Recency: recent publications are prioritised, except when historical context is analytically necessary.

To strengthen validity, both primary and secondary sources are systematically examined, with attention to triangulation, credibility, and traceability (Bowen, 2009, pp. 28–29; Yin, 2018, p. 197).

3.3 Analytical framework and methodological approach

This subchapter details the analytical strategies used to address each specific study objective, as well as the primary study objective. While all analyses are qualitative, they differ in structure, purpose, and underlying logic.

3.3.1 Qualitative analysis used in each study objective

3.3.1.1 Specific objective 1: Framework validation through case study

This component of the study employs a qualitative case study design to validate the Framework draft for adaptive Defence Planning under unresolvable uncertainty (table 4). The case study approach was selected because it enables an in-depth, context-specific

examination of complex organisational phenomena and allows for the integration of theory development with empirical observation (Yin, 2018, p. 158). The objective is to assess the framework's operational relevance and adaptability by applying it to a real-world strategic actor—NATO—while incorporating relevant UK-specific insights to test applicability across national contexts.

Case selection rationale. NATO was chosen as the primary case for three reasons. First, its operational responses during the Ukraine crisis provide a contemporary and data-rich instance of defence planning under extreme uncertainty. Second, as a multinational alliance, NATO operates in a complex adaptive environment, making it suitable for testing the framework's emphasis on strategic agility and distributed decision-making. Third, NATO's governance and operational mechanisms are extensively documented in public sources, enabling triangulation of evidence.

UK-specific material was integrated where relevant, either to compensate for gaps in the NATO-level evidence base or to assess the framework's applicability to national defence planning. The UK was selected as a complementary case because of its demonstrated capacity for adaptation in hybrid warfare contexts, its institutional flexibility in procurement and capability development, and its active role in multinational operations. Incorporating UK evidence therefore allows the study to test the transferability of the analytical framework across both alliance and national settings. This embedded comparative logic strengthens the potential for analytical generalisation, by showing how insights derived from NATO structures may also illuminate national-level defence reforms (Yin, 2018, pp. 58, 80; George & Bennett, 2005).

Analytical framework. The *Framework draft for adaptive Defence Planning under unresolvable uncertainty* was applied deductively to the collected data. The analysis focused on 11 core components (phases):

1. Scoping and context setting
2. Environmental sensing and information gathering
3. Analysis
4. Vision building (political guidance), scenario generation and testing
5. Risk evaluation, validation and communication
6. Strategy development and risk mitigation
7. Organisational adaptation
8. Implementation and resource management

9. Collaborative Governance

10. Crisis response and Black Swan preparedness

11. Monitoring, feedback, and continuous learning

Each activity within the phases was coded and classified using a four-category validation scale: Confirmed (C), Partially Verified but Recognised as Relevant (PV), Not Identified but Recognised as Relevant (NI), and Added Activity (AA). This classification reflects established methodological recommendations for systematic coding (Miles & Huberman, 1994, p. 11), model validation through theory–data comparison (Yin, 2018, pp. 79–80), and adaptive frameworks that allow recognition of unexpected yet relevant practices (Patton, 2002, pp. 66–67). The design of these categories follows principles of transparency, traceability, and methodological rigour, ensuring that each analytical decision can be justified within the research logic.

Reasoning approach. The analysis adopted an abductive reasoning process, moving iteratively between theoretical expectations and empirical evidence (Tavory & Timmermans, 2014). This approach allowed refinement of the framework to better reflect the operational realities of multinational defence planning under unresolvable uncertainty.

Outcome of methodological application. The result of this method resulted in a validated and refined framework, grounded in both theory and practice, that offers transferable insights for other defence organisations operating in complex adaptive environments.

3.3.1.2 Specific objective 2: Overcoming institutional barriers through realist evaluation

The second study objective employs a framework-guided conceptual synthesis to examine structural, cultural, and governance-related barriers to defence planning. Literature selection followed a purposive, theory-driven strategy, prioritising conceptual and empirical works that addressed institutional reform in defence governance, civil–military integration, strategic alignment, defence innovation, and whole-of-government coordination. Given the Euro-Atlantic scope of the thesis, the synthesis drew primarily on works from this context, while highlighting insights considered transferable to other regions and acknowledging that non-Western applications remain an agenda for future research.

The first stage of analysis synthesised solution-oriented frameworks derived from the academic and policy literature, inductively grouping reform measures into thematic categories such as doctrinal integration, institutional learning, strategic coherence, resource

governance, innovation, and civil–military collaboration. These categories were grounded in multiple scholarly perspectives to ensure conceptual robustness and reduce the risk of single-source bias (Gerring, 2007, p. 17; George & Bennett, 2005).

The second stage applied a framework-oriented comparative synthesis to illustrate each reform category with empirical examples. These illustrations are not designed as case studies but as instances of theoretical principles in practice, consistent with the logic of analytical generalisation (Yin, 2018, pp. 79–80). As Gerring (2007, p. 21) notes, the boundary between case studies and illustrative samples lies in emphasis and degree: the more numerous and less intensively examined the examples, the less they resemble traditional case studies and the more they serve as heuristic samples. In this study, the empirical examples included in the synthesis tables are presented for their illustrative and heuristic value rather than as evidence of efficiency or effectiveness. They demonstrate how reforms, doctrines, or institutional practices have been operationalised in real-world contexts—sometimes successfully, sometimes partially, and occasionally with limited or even negative results. This distinction aligns with the principle of heuristic case use (George & Bennett, 2005), whereby examples illuminate mechanisms, pathways, and tensions in theory–practice translation without implying direct causal validation.

Empirical illustrations were purposively selected to highlight diversity in institutional contexts and reform trajectories. The U.S. provided the primary reference point, given its extensive doctrinal development, institutional reforms, and publicly accessible planning documentation. Complementary examples were drawn from Nordic states, particularly Sweden and Finland, where Total Defence approaches exemplify integrated security ecosystems and civil–military collaboration. Additional illustrations were included from alliance and national contexts where relevant doctrinal or institutional practices were available, reflecting the study's aim of mapping plausible adaptations rather than seeking statistical representativeness (Seawright & Gerring, 2008, p. 296).

The interpretive logic was guided by the Context-Mechanism-Outcome (CMO) heuristic of realist evaluation (Pawson & Tilley, 1997; Marchal et al., 2012, p. 202; Mukumbang et al., 2020, p. 490). Reform measures were treated as mechanisms whose plausibility and adaptability depended on contextual conditions—such as institutional culture, political oversight, or operational environments—producing specific outcomes in areas including interoperability, democratic control, or institutional resilience. This realist-

informed design enabled recognition of both alignment and divergence between theoretical prescriptions and observed practices.

Findings are presented in matrix-style tables that juxtapose "solutions from literature" with "empirical illustrations." This tabular format, recommended in comparative qualitative research for enhancing transparency and synthesis (Miles, et al., 2014), provides a structured mapping that highlights recurring practices, innovative adaptations, and context-dependent applications. The iterative process of moving between theoretical frameworks and empirical illustrations follows the tradition of abductive theorising (Tavory & Timmermans, 2014), enabling the refinement of concepts and generating a richer understanding of reform pathways.

The methodological output of this process is twofold: (1) synthesis tables that map theoretical solutions to empirical illustrations across institutional contexts, and (2) a consolidated framework that organises reforms according to overarching strategic goals, such as strengthening joint doctrine, fostering institutional innovation, and reinforcing democratic control. Analytical continuity is ensured by explicitly linking these solutions back to the structural dysfunctions identified earlier in the study, with the discussion chapter further assessing their plausibility, contextual dependence, and limitations.

3.3.1.3 Specific objective 3: Comparative case analysis of governance failures and reforms

This objective applies a qualitative comparative case study design to examine reform dynamics in four national defence systems: Belgium, Canada, Austria, and Ukraine. The approach follows established qualitative research principles that emphasise in-depth contextual analysis, theory-driven coding, and cross-case synthesis (Yin, 2018, pp. 272–275; George & Bennett, 2005)

Case selection was purposive and theory-driven, aimed at maximising analytical leverage on the relationship between defence procurement dysfunctions and reform strategies. The study employs a "most different systems" design (Przeworski & Teune, 1970, pp. 34–39), selecting countries that vary significantly in political structure, transparency culture, alliance commitments, and defence industrial base, but share common and recurrent dysfunctions in procurement governance.

Belgium was included as a NATO member with a consensus-based political system and a long-standing tradition of coalition governance. Canada represents a Westminster-style democracy with a highly professionalised procurement bureaucracy and active

engagement in multinational operations. Austria provides a case of a neutral European state with distinctive procurement oversight traditions rooted in its non-aligned foreign policy. Ukraine offers a post-Soviet reform trajectory characterised by urgent wartime procurement challenges, high corruption risk, and externally driven reform pressures. Together, these cases provide variation in context while converging on a shared problem set, enabling theory-informed comparison of reform effectiveness (Gerring, 2007, p. 48).

The comparative logic is framework-guided synthesis rather than variable-based comparison. Building on established qualitative comparative analysis principles (Yin, 2018, pp. 24, 243), the study identifies potential solutions from the academic and policy literature, incorporating, where possible, multiple scholarly perspectives.

The analytical framework for assessing dysfunction and reform in defence procurement (table 5) is directly applied as the coding and evaluation matrix for all four cases. This framework distinguishes between:

- Institutional/structural solutions – formal mechanisms such as legal frameworks, oversight institutions, and technological tools.
- Behavioural/leadership interventions – informal and cultural practices including leadership style, training, and norms that shape compliance and adaptability.

For each case, analysis proceeds through three iterative steps, consistent with thematic analysis and process tracing best practices (Beach & Pedersen, 2019, pp. 1–2):

1. Identify the most salient dysfunction(s) based on documented procurement challenges.
2. Map observed reforms to the relevant institutional and behavioural categories in the framework.
3. Evaluate the impact of these reforms on transparency, accountability, and effectiveness.

This structure ensures methodological consistency and comparability across cases, even when national contexts differ significantly. Moreover, it avoids “paper compliance” bias by ensuring that both formal and informal dimensions are systematically considered (Peters, 2019, pp. 44, 65).

By synthesising conceptual insights from organisational behaviour, institutional reform, and public procurement studies, the research builds a multi-level framework for assessing reform effectiveness. The study combines deductive reasoning (applying theories

to empirical data) and inductive refinement (drawing new insights from the cases material) to advance understanding of institutional transformation in defence settings (Bennett & Checkel, 2012, pp. 10, 22).

While chapter 4 focuses on descriptive and analytical mapping of reforms, the link back to diagnosed dysfunctions—as presented in earlier chapters—is performed in the Discussion chapter. There, reform measures are assessed not only for their direct outcomes but also for their capacity to address root causes of dysfunction, as summarised in table 18, which consolidates reform pathways against the institutional dysfunctions identified earlier in the study.

3.3.1.4 Primary objective: Conceptual synthesis and strategic framework development

The methodology of this thesis is centred on achieving its primary objective through a process of conceptual synthesis leading to the development of a comprehensive strategic framework for competitive defence. This approach was selected because the phenomena under investigation—unresolvable uncertainty, structural and institutional barriers, and the distortions introduced by ambition, bias, and corruption—cannot be adequately addressed by a single disciplinary perspective. Instead, the complexity of the research problem required the integration of diverse literatures and policy debates into a coherent methodological pathway capable of producing a unifying framework.

The first stage of this process consisted of the analytical integration of multiple theoretical, doctrinal, and empirical sources. Insights from defence economics, strategic studies, public administration, and organisational theory were systematically examined in order to identify points of convergence and divergence across concepts such as adaptability, resilience, innovation, civil–military relations, and strategic competition. This integrative effort established the conceptual foundations upon which the remainder of the research could build.

The second stage involved comparative structuring and abstraction. Here, the identified concepts and dimensions were re-examined at a higher level of generality so that overlapping themes could be consolidated and reconfigured into broader analytical categories (Beach & Pedersen, 2019, pp. 26, 80). Systems thinking and strategic management heuristics were employed to ensure that these abstractions retained explanatory power while also being adaptable to different institutional and operational contexts. This

step was critical for reducing conceptual fragmentation and for producing an organising logic capable of addressing both theoretical debates and practical challenges.

The third and final stage was the articulation of the framework itself. The abstracted categories were structured into a phased model that defines strategic foci, key dimensions, and operational guidance, with emphasis on cyclical and iterative processes rather than linear progression. In methodological terms, this stage entailed an interpretative synthesis in which abductive reasoning linked empirical evidence with theoretical constructs, enabling the construction of a framework that is both conceptually rigorous and practically applicable.

3.3.2 Quantitative analysis

No quantitative methods are used in this research. Where numerical data appears (e.g., in budgetary trends or timelines), it is used descriptively to support qualitative interpretation.

3.4 Validity, reliability, and ethical considerations

This research acknowledges the complexity of ensuring internal validity and external relevance in theory-driven, qualitative inquiry. To mitigate this challenge:

- Triangulation is applied across multiple sources and disciplinary perspectives (Yin, 2018, p. 197).
- Theory testing and refinement are carried out through abductive reasoning and feedback loops between literature and case material (Bennett & Checkel, 2012, pp. 10–11).
- Transparency and replicability are prioritised by relying on open-access, verifiable secondary sources.

Regarding ethical considerations, the study adheres to principles of intellectual integrity, data transparency, and academic honesty. It does not involve human participants, sensitive personal data, or classified material. Consequently, no institutional ethics review was required.

3.5 Limitations of the methodology

The research design is shaped by three principal limitations:

- Restricted access to confidential data. The reliance on secondary data excludes classified or insider information, limiting insights into informal institutional dynamics or elite bargaining.
- Lack of statistical generalisability. While the case study method enables process-tracing and theory refinement, it does not support statistical inference.

Instead, the study prioritises conceptual transferability to similarly complex policy environments (Mahoney & Goertz, 2006, p. 242).

- Absence of primary interviews. The exclusion of interviews limits insights into behavioural resistance and internal learning processes. However, this gap is partially mitigated through the use of audit trails, institutional records, and policy analyses that reflect institutional reasoning and behaviour over time.

Despite these constraints, the research provides a methodologically rigorous, theory-driven contribution to the field of defence studies, offering actionable insights into strategic competitiveness, institutional reform, and governance resilience.

4. Empirical findings and analysis

This chapter presents the empirical findings of the study, organised around the three specific research objectives. Building on the methodological foundations established in chapter 3, it provides an analysis of how defence organisations confront uncertainty, institutional dysfunctions, and behavioural pathologies, and how reform pathways can be identified and assessed. The chapter is structured in four main subchapters. Subchapter 4.1 addresses the first specific objective by testing the robustness of adaptive planning frameworks against unresolvable uncertainty, drawing on NATO's adaptation experience since 2014. Subchapter 4.2 turns to the second objective, employing realist evaluation to assess institutional barriers and reform mechanisms, with synthesis tables that map theoretical solutions to empirical illustrations. Subchapter 4.3 addresses the third objective through comparative case analysis of Belgium, Canada, Austria, and Ukraine, highlighting the interplay of governance dysfunctions and reform strategies. Finally, subchapter 4.4 integrates these strands, providing a cross-objective synthesis that links empirical findings back to the conceptual and analytical frameworks developed in earlier chapters. By combining validation, realist synthesis, and comparative analysis, chapter 4 provides the empirical grounding for the competitive defence framework developed in chapter 5. It demonstrates not only recurring challenges across diverse defence systems but also the conditions under which reforms can succeed or fail, thereby offering a foundation for both theoretical refinement and practical application.

4.1 NATO's adaptation to the Ukraine Crisis (2014-2025)

The NATO's approach to the Ukraine crisis, which began in 2014 with Russia's annexation of Crimea and continues to evolve, offers a significant context for evaluating adaptive strategic frameworks in defence planning. The complexity of this protracted geopolitical challenge needed NATO's continuous navigation through multifaceted uncertainties, rapidly evolving threats, and shifting global alliances.

This case study provides a foundation for assessing the application of scenario-based planning, strategic agility, and risk management in practice, particularly within NATO's broader defence planning framework. This framework is a well-established, institutionalized, and recurring process that has undergone up to ten distinct iterations since the 1970s (Castilla, 2024, p. 76).

NATO initiatives demonstrate its ability to adapt to high-stakes and dynamic circumstances:

- Improvement of intelligence sharing and implementation of the Readiness Action Plan in 2014, which enhanced NATO's ability to respond swiftly to emerging threats (Davis Jr., 2023, March 16, p. 2; Zima, 2022, October 12, p. 5).
- The establishment of enhanced Forward Presence (eFP) battlegroups in the Baltic states and Poland in 2016 (Zima, 2022, October 12, p. 2).
- Continuous adaptation of NATO's deterrence and defence posture, including the adoption of the NATO 2030 initiative (NATO, 2021, June), and the reinforcement of eastern flank – "Eastern Sentry" – after the drone incident in Poland (NATO, 2025).

In addition to these specific measures, NATO's ACT implemented the Long-Term Military Transformation Programme, integrating foresight methodologies to ensure preparedness in a highly volatile security environment (NATO ACT, 2018, p. 9). Key elements include:

- Strategic Foresight Analysis (SFA): First published in 2013 and subsequently updated in 2015, 2017, and 2023; the SFA has served as a cornerstone for identifying future security challenges and trends (NATO ACT, n.d.-a).
- Framework for Future Alliance Operations (FFAO): Building on the SFA, the FFAO identifies military implications to guide defence planning, aligning with NATO's Defence Planning Process. Key FFAO reports were released in 2015 and 2018.

The Ukraine crisis demonstrates how NATO adapted strategic foresight and planning activities to align with its objectives, underscoring the relevance of adaptive frameworks in managing large-scale uncertainties.

Case selection rationale: NATO was chosen as the primary case study due to its strategic role during the Ukraine crisis and its distinct contributions to defence planning. As a military alliance, NATO embodies collective defence and international coordination, revealing strategic agility and robust risk mitigation in addressing shared and evolving threats. Where relevant, UK-specific inputs are integrated into the analysis to enhance the framework's applicability across diverse strategic contexts.

This study applies the Framework for Adaptive Defence Planning Under Unresolvable Uncertainty to assess NATO's implementation of key activities, including environmental sensing, scenario generation, risk evaluation, and strategy development. Table 3 presents the

validation results, categorizing the extent to which the framework's components were operationalized using four classifications: Confirmed (C), Partially Verified but Recognized as Relevant (PV), Not Identified but Recognized as Relevant (NI), and Added Activity (AA).

Compared to table 4, table 9 offers a refined and validated framework, incorporating additional activities (AA) to address identified gaps, such as enhancing intelligence integration, refining organisational adaptation, and optimizing resource management. The validation process further assigns status indicators (C, PV, NI) to assess the practical implementation of each activity.

Table 9 – Framework for adaptive defence planning under unresolvable uncertainty validation

Phase	**Activities validation and augmentation** Confirmed—C Partially Verified (but recognized as relevant)—PV Not Identified (but recognized as relevant)—NI Added Activity—AA	**References**
1. Scoping, context setting and mobilization of participants	- Define the foresight purpose, background, scope, parameters, methodology, duration, and time horizon. For defence planning, consider three time horizons: short-term (0–6 years), medium-term (7–19 years), and long-term (20+ years) to capture adaptation needs. C - Assess available financial, technological, and HRs. C - Engage key stakeholders and domain experts to ensure a multidisciplinary perspective. C - Outline the key characteristics of the strategic and operational environment. AA - Establish working groups with clearly defined research responsibilities and activities. AA - Incorporate lessons learned from previous iterations while refining key concepts, addressing known gaps, and integrating emerging priorities. AA	Castilla, 2024, p. 92; Davis Jr., 2023, March 16, p. 17; NATO, 2020, November 25, p. 8; NATO, 2021, June; NATO ACT, 2016, April 19–20; NATO ACT, 2017, pp. 11–13, 75; NATO ACT, 2018, pp. 9–10, 50; NATO ACT, 2023, pp. 5, 11–14, 22–23.
2. Environmental sensing and information gathering	- Embed AI-assisted horizon scanning tools for proactive monitoring. AA - Conduct continuous STEEPVL/PMESII-PT analysis using expert panels, surveys, and available intelligence sources. C - Identify and track emerging trends, uncertainties, and disruptive factors. C - Integrate real-time intelligence sharing mechanisms to enhance situational awareness and adaptability. PV	Davis Jr., 2023, March 16, pp. 12–13, 18 25–27; McKale, 2024, November 8; NATO, 2020, November 25, pp. 29-30, NATO, 2021, June; NATO ACT, 2017, pp. 15–77; NATO ACT, 2018, pp. 13-19, 44-45; NATO ACT, 2021; NATO ACT, 2023, pp. 5, 11–13, 15–90; Rühle & Roberts, 2021, March 19.

3. Analysis	- Apply systems-thinking frameworks to interpret data and identify key drivers of change. C - Analyse historical patterns to assess the evolution of identified trends. C - Leverage big data analytics for dynamic insights into emerging threats and opportunities. AA/PV - Use multidimensional frameworks to evaluate the implications of emerging and disruptive technologies. PV - Assess interdependencies among drivers (trends or uncertainties) using structural and cross-impact analysis (e.g., 2x2 matrix). NI (C in UK) - Rank key drivers based on their impact and level of uncertainty. PV (C in UK) - Develop profiles for emerging threats, vulnerabilities, and opportunities. C - Conduct integrated vulnerability, threat, and opportunity analyses. C - Cross-validate findings through collaborative thinking and expert consultation. AA	Castilla, 2024, p. 103; Davis Jr., 2023, March 16, pp. 12–13, 33; MoD, UK, 2024, September 27, pp. 29–30; NATO ACT, 2017, pp. 15–77; NATO ACT, 2023, pp. 12, 15–90; Rühle & Roberts, 2021, March 19.
4. Vision building (political guidance), scenario generation and testing	- Host collaborative visioning workshops with stakeholders (e.g., using the *Cynefin* Framework). C - Develop strategic/operational scenarios (e.g., for a set of 2x2 scenarios combine extreme values of the key [and independent] uncertainties and add all the high-impact trends to each combination; for more elaborated scenarios: combine intermediate values of the uncertainties and vary degrees of the trends [use AI and machine learning for exploratory modelling]). C - Compare the developed scenarios against the current situation. C - Conduct stress tests for extreme scenarios, including hybrid warfare and cyber threats. C - Use morphological analysis to ensure scenario consistency and plausibility. C - Integrate quantitative models and data-driven evaluation techniques. C - Regularly update scenarios based on emerging data to maintain relevance. C - Apply backcasting methods to align ends, ways, and means. C	Bjørgul, & Sellevåg, 2022, pp. 2–7; NATO ACT, 2023, pp. 12, 91–92; NATO ACT, 2024, August 26; NATO Communications and Information Agency, 2019, p. 1-1; Castilla, 2024, pp. 5, 115; Hodicky et al., 2020; Kancs, 2022; Moteka, 2023, pp. 77–78; Rühle & Roberts, 2021, March 19.
5. Risk evaluation, validation and communication	- Conduct computer-assisted exercise simulations. AA - Include top-level civilian decision-makers in short exercises. AA - Identify and assess preventable and external risks using multidisciplinary risk assessment tools. C - Evaluate current and future operational risks for each capability shortfall based on operational impact, personnel safety, and resource loss. AA - Align long-term strategic vision with organisational capabilities (level of ambition). C - Assess political and strategic risks, including overreach (expanding beyond feasible limits in foreign and defence policy) and gaps between the required force structure, capabilities, and available resources. PV (C in the UK) - Categorise, prioritise, and define acceptable risk tolerance measures. PV - Validate risk assessments through structured consultations. C - Ensure timely dissemination of findings via classified briefings and internal reports, with declassified insights shared publicly. PV (C in the UK)	Castilla, 2024, pp. 45–46, 96, 99, 127, 197, 238; Davis Jr., 2023, March 16, pp. 1–2, 4, 10, 12, 14–17, 23, 25, 27; MoD, UK, 2015, August, pp. 32, 38; MoD, UK, 2018, October 2, pp. 8–9; NATO, 2022, June 29, pp. 6–8; NATO, 2025, January 22; NATO ACT, 2018, p. 10; NATO ACT, 2024, August 26; Rühle & Roberts, 2021, March 19.

6. Strategy development and risk mitigation	- Develop adaptive strategies aligned with evolving security priorities and multiple futures. C - Prioritise military capability development based on critical shortfalls, categorising them as urgent (high-risk), intermediate (moderate-risk), or minor (low-risk). AA - Develop actionable mitigation plans for high-priority risks. PV (C in the UK) - Define shared resilience goals and align them with evolving international defence standards and alliances. AA - Ensure financial sustainability to support defined strategies without interruptions. PV (C in the UK) - Build secure, interoperable systems for data sharing. C - Integrate intelligence planning with global developments, ensuring flexibility through embedded options with branches and decision points. C - Establish measures to monitor (early-warning systems), influence, and mitigate the impact of key strategic drivers. C - Protect and foster the adoption of emerging and disruptive technologies. AA - Maintain plans as living documents in virtual environments, continuously updated based on intelligence, readiness, and strategic conditions. C - Define minimum capability requirements and apportion targets for nations/services. AA - Establish formal interagency collaboration mechanisms and advisory working groups to oversee implementation. C/AA - Embed measurable performance indicators to ensure accountability, using structured assessments in defence planning, operational readiness, governance integrity, burden-sharing, and cyber resilience. PV	Castilla, 2024, pp. 51, 85–86, 99–101, 121, 123, 128–129, 140, 142, 197; Chiriac, 2022, p 11; Davis Jr., 2023, March 16, pp. 4, 6, 9, 11, 15–16, 19, 22–24, 32–33; MoD, UK, 2015, August, pp. 28, 30–32, 37–38; MoD, UK, 2025, February 18; NATO, 2022, June 29, pp. 9–11; NATO, 2024b; NATO, 2024, October 17; NATO, n.d.-a; NATO ACT, 2018, pp. 24, 27–39; NATO ACT, n.d.-b; NATO Strategic Communications Centre of Excellence, n.d.; Prime Minister's Office & MoD, 2025, February 25.
7. Organisational adaptation	- Foster decentralised and adaptive command structures. PV - Design flexible organisational frameworks to enhance agility. PV (C in the UK) - Embed AI and advanced analytics in decision-making. C - Tailor organisational designs to large-scale, whole-of-enterprise collaboration. AA - Empower mid-level decision-makers with resources and authority. PV - Streamline governance and decision-making processes. AA (NATO and UK) - Integrate resilience considerations into planning processes. AA - Establish units dedicated to innovation and to data policy. C/AA - Leverage private sector technology, innovation, and expertise (e.g., SpaceX and Microsoft support to Ukraine). AA	Davis Jr., 2023, March 16, pp. 6, 10–13, 15, 17–18, 24, 27-28, 30, 37; Headquarters Supreme ACT, 2023; MoD, UK, 2025, February 18; NATO ACT, 2023, October 30; NATO ACT, 2023, December 15; NATO ACT, n.d.-c; NATO Command and Control Centre of Excellence (C2COE), 2024, September 11; Prime Minister's Office & MoD, 2025, February 25; Rühle & Roberts, 2021, March 19.

8. Implementation and resource management	- Integrate strategic foresight and risk management into decision-making. C - Develop resilient platforms adaptable to evolving threats. C - Invest in human capital development for leaders, operators, and professionals. AA - Enhance procurement agility to rapidly adapt to operational and technological shifts. NI (C in the UK) - Establish real-time resource tracking for dynamic reallocation. C - Create mechanisms for resolving inter-service resource conflicts through joint planning, coordination, and prioritization (e.g. NATO Defence Planning Process, Allied Command Operations, ACT, UK Strategic Command and Joint Requirements Oversight Council). C (NATO and the UK) - Optimize shared logistics and sustainment capabilities for multi-branch operations to enhance interoperability, cost-effectiveness, and resource management. AA	Castilla, 2024, p. 252; Davis Jr., 2023, March 16, pp. 23–24, 37; Grigore, 2023, p. 133; JCS, 2021, October 30, p. A-1; MoD, UK, 2015, August, p. 28; NATO, 2020, November 25, p. 8; NATO, 2021, June; NATO Support and Procurement Agency, n.d.; NATO ACT, n.d.-b; Strategic Command, n.d.
9. Collaborative governance	- Promote intelligence delivery tailored to the needs of political and military leaders. AA - Establish participatory platforms for cross-sector decision-making and knowledge-sharing.C - Cultivate a risk-aware, adaptable, and ethically responsible organisational culture. C - Develop ethical guidelines and training programmes for the responsible use of autonomous and AI-enabled systems. C - Integrate ethical governance mechanisms, including independent review boards where applicable. PV (C in the UK)	Castilla, 2024, pp. 133–135, 143; Christie, 2020; Davis Jr., 2023, March 16, pp. 6–7; Milutinović, & Lekić, 2017, pp. 3, 19; MoD, UK, n.d.; NATO, 2024a; NATO, 2024b; NATO ACT, n.d.-a; NATO ACT, n.d.-b; NATO Communications and Information Agency, n.d.; NATO STO, 2020, March, p. 25; NATO STO, 2022, September, pp. 4-16, 9-1 – 9-20; NATO STO, 2024.
10. Crisis response and Black Swan preparedness	- Establish rapid-decision task forces for emergent multi-domain scenarios. PV (C in the UK) - Conduct regular stress tests on critical defence infrastructure, command-and-control networks, and logistics. C - Develop contingency plans and training simulations for high-impact, low-probability (Black Swan) events. C	Davis Jr., 2023, March 16, pp. 6, 14, 16. Joint Expeditionary Force, n.d.; NATO, 2023, July 27; NATO, n.d.-b.
11. Monitoring, feedback, and continuous learning	- Develop and refine key performance indicators to assess strategy effectiveness. C - Conduct periodic multi-level operational assessments (tactical, operational, and strategic). AA/PV - Integrate lessons learned into strategic revisions for continuous improvement. C - Automate monitoring systems to provide real-time, transparent feedback on capability development and performance. AA/PV - Foster innovation and adaptability through collaborative research initiatives (e.g., Defence Innovation Accelerator for the North Atlantic [DIANA]). AA - Capture and refine best practices for iterative improvements in strategic frameworks. AA	Castilla, 2024, p. 201, 252; Davis Jr., 2023, March 16, pp. 2, 5–24; NATO, 2020, November 25, pp. 29–30; NATO, 2021, June; NATO, 2022, June 29, p. 9; NATO, 2025, February 14; NATO ACT, n.d.-a; NATO Joint Analysis and Lessons Learned Centre (JALLC), 2023, March 10; NATO JALLC, n.d.; Rühle & Roberts, 2021, March 19.

4.2 From theory to practice: assessing institutional solutions for strategic defence reform

Building on the institutional barriers previously examined, this subchapter adopts a dual analytical approach to identify and assess strategic pathways for defence reform. It integrates theoretical insights with empirical evidence, thematically presented through parallel tables. The analysis explores how defence institutions can enhance strategic coherence, optimise resource allocation, and improve adaptability through mechanisms such as joint planning, civil-military integration, and adaptive governance frameworks. Emphasis is placed on recent scholarship addressing interoperability, innovation, and democratic accountability, while acknowledging gaps—particularly regarding non-Western defence systems and emerging domains like cyber resilience and climate security. By aligning theory with implementation, this subchapter evaluates the feasibility, impact, and transferability of reform across institutional contexts.

4.2.1 Enhancing joint strategy through doctrinal integration and interoperability

A growing body of empirical evidence highlights the centrality of doctrinal integration, institutional learning, and interoperable frameworks in fostering effective multi-domain operations and joint strategic coherence. Defence institutions have increasingly adopted cross-service doctrinal alignment, structured lessons-learned systems, iterative scenario planning, and interoperable command architectures. These initiatives facilitate coordination among services and allies, enabling adaptive responses to evolving threats.

Table 10 synthesises key literature-based recommendations and corresponding institutional practices that operationalise these principles.

Table 10 – Enhancing joint strategy through doctrinal integration, institutional learning, and interoperability

Solutions from literature	Empirical illustrations
Establish interservice coordination mechanisms to align service contributions and reduce rivalry (Snider, 1996, p. 21; Lyle, 2019, August 5, p. 4).	Post-GNA of 1986 reforms (e.g., empowering Combatant Commanders and clarifying command chains in Desert Strom operations) allowed the U.S. to integrate forces across services and theatre levels (Cozad et al., 2023, p. 183; Forster, 2012, p. vii; Lovelace & Young, 1997, p. 94)
Restructure the Joint Staff to include a dedicated design and strategy division that directly supports the Secretary of Defence in strategic decision-making (Lyle, 2019, August 5, p. 11).	Following the 2017 National Defense Authorization Act (Section 911), the DoD established Secretary of Defense–Empowered Cross-Functional Teams. This improved the Department's "speed of relevance" in strategy and decision-making (Garamone, 2018, July 12).

Align objectives across services and allies to support integrated deterrence (Teague & Braswell, 2023, March, p. 3).	The 2022 National Defense Strategy from the U.S. emphasises integrated deterrence as a central concept (U.S. DoD, 2022, October 27, p. 1). NATO's *Steadfast Deterrence 2025* exercise aligns strategic objectives across services and allies enhancing operational integration and deterrence credibility (Darr, 2025, June 5; NATO Allied Air Command, 2025, May 29).
Develop and adapt joint doctrine to enable interoperability in strategy, operations, logistics, and command (Collins, 2002, pp. 101-102; Cozad et al., 2023, p. 45).	Over 100 U.S. joint doctrine documents and more than 60 NATO publications guide and standardise multinational military operations (Collins, 2002, p. 101).
Regularly update doctrine to ensure its relevance to evolving threats and strategic priorities (Lovelace & Young, 1997, p. 94; Westa, 1999, p. 2).	The UK Defence Doctrine, as outlined in *Joint Doctrine Publication 0-01*, is regularly updated to reflect evolving threats, strategic competition, and information environment challenges, as demonstrated in its 6th edition (MoD, UK, 2022, November 3).
Reinforce cooperation with allied forces and civilian agencies to support joint capabilities and integrated deterrence (Teague & Braswell, 2023, March, p. 3).	The UK's Integrated Review and Defence Command Paper aligned joint force structures for deterrence in contested regions, while the Fusion Doctrine institutionalised cross-departmental planning via the National Security Council to integrate military and civilian efforts (HM Government, 2023, March, pp. 6-7; MoD, UK, 2021, January, pp. 2–3).
Assign accountability for lessons learned, mandating MoDs to institutionalise lessons from operations into policy and doctrine (Schlueter et al., 2025, p. 24; US DoD, 2022, p. 15).	Both the U.S. and the UK have derived important lessons learned from recent conflicts—particularly Afghanistan, Iraq, and Ukraine—that have significantly influenced their defence planning and the development of a joint operational culture (Cozad et al., 2023, pp. 71–72; HM Government, 2023, March, p. 11).
Implement flexible and iterative strategic planning, replacing rigid top-down approaches (Schlueter et al., 2025, p. 24).	NATO initiatives—including the SFA (NATO ACT, n.d.-a), the FFAO (NATO ACT, 2018), Federated Mission Networking (NATO ACT, n.d.-b), the Innovation Hub (NATO ACT, n.d.-c) and the DIANA (NATO, n.d.-c) —offer flexible, iterative guidance on strategic planning, warfighting and warfare development.
Establish centralised knowledge dissemination platforms for structured and continuous learning across commands and alliances (NATO STO, 2024, May, p. 2-37; Schlueter et al., 2025, p. 24).	The U.S. DoD uses the Joint Lessons Learned Information System (JLLIS) to collect, share, and analyse operational insights across services, enhancing interoperability with partners like NATO (JCS, n.d.).
Incorporate scenario planning, wargames, and simulations into strategic planning to identify cross-service dependencies and mitigate risk (Ochmanek et al., 2023, p. 17).	RAND simulations exposed critical shortfalls in joint U.S. responses to potential Chinese aggression in Taiwan, leading to adjusted force posture (Ochmanek et al., 2023, pp. 17–18).
Implement interoperable command and communication systems across services and allied forces to eliminate operational friction and enhance coordinated decision-making (Forster, 2012, pp. 9–11, 15–16; Kobs, 2011).	The U.S. Combined Joint All-Domain Command and Control (CJADC2) integrates command across domains; progress noted by the XVIII Airborne Corps and the Chief Digital and AI Office (U.S. Government Accountability Office, 2025, April, p. 25).
Leverage lessons learned institutions to identify doctrinal, experimentation and real-world deficiencies and enhance joint learning systems (Cozad et al., 2023, p. 80, 85, 91, 96, 160; Scollick, 2020, p. 32; Schlueter et al., 2025, p. 24; U.S. Government Accountability Office, 2025, April, p. 26).	Lessons from Operation Enduring Freedom informed the planning of Operation Iraqi Freedom (Cozad et al., 2023, pp. 71, 78). The U.S. Joint Lessons Learned Program systematises data from operations, exercises, and wargames (JCS, 2021, December 30, p. A-2).

4.2.2 Strengthening institutional mechanisms for strategic coherence and whole-of-government coordination

Strategic fragmentation, resource misalignment, and weak oversight persist as challenges to effective defence governance. In response, institutional reforms—including oversight bodies, clarified legal authorities, and structured civil-military dialogue—aim to promote coherence, interservice integration, and alignment with national objectives.

Table 11 links theoretical solutions with empirical evidence illustrating enhanced oversight, legitimacy, and coordination through structural reforms.

Table 11 – Strengthening institutional mechanisms for strategic coherence and whole-of-government coordination

Solutions from literature	Empirical illustrations
Promote interservice respect and highlight joint achievements to improve cohesion and build camaraderie (Teague & Braswell, 2023, March, p. 3).	Joint training initiatives and interservice cooperation during multinational operations such as in NATO exercises (e.g., Trident Juncture) foster cohesion (NATO STO, 2024, May, p. 6-14).
Establish strategic oversight mechanisms (Elliott, 2015, pp. 222–223, 229).	Israel's "War Cabinet" and Australia's Joint Statutory Committee enhance strategic accountability (Knesset, 2001; Blenkin, 2024, March 25).
Ensure military leaders advocate against inadequate resourcing and explicitly state risks to strategic goals (Elliott, 2015, pp. 222–223).	Testimonies before UK Parliament Defence Committee regularly address the operational risks of budgetary constraints (House of Commons Defence Committee, 2022, pp. 25, 59–60).
Enhance joint and integrated command structures to improve strategic alignment and operational effectiveness (Egnell, 2013, p. 251; NATO STO, 2024, May, p. 2-33).	The development of the U.S. CJADC2 underscore a structural shift towards jointness and faster, coordinated decision-making (Cozad et al., 2023, p. 99).
Enable flexible multinational coalitions to enhance interoperability and operational agility (Flynn, 2022, p. 318; Saxi, 2017, pp. 175, 190–191).	The Franco-British CJEF and the JEF foster agile, interoperable deployments beyond NATO (Flynn, 2022, p. 318; Saxi, 2017, pp. 175, 190–191).
Create centralised institutions for interservice coordination and strategic resource alignment (Cozad et al., 2023, p. 41).	The GNA significantly strengthened the authority of the Chairman of the JCS (CJCS) (Lovelace & Young, 1997, p. 94) and established mechanisms like the Joint Requirements Oversight Council to facilitate interservice coordination and strategic resource alignment across the U.S. military (Snider, 1996, p. 19).
Implement liaison officer programs, cross-service postings, and regular joint leadership forums to institutionalise coordination (Cozad et al., 2023, p. 52; NATO STO, 2024, May, p. 2-36).	Under the GNA, the U.S. DoD mandates JDAs for promotion to senior ranks, enhancing cross-service coordination and strategic integration. Officers rotate through joint and multinational commands, fostering a sustained joint culture (Locher, 2002, p. 244). Regular joint leadership forums, such as the CJCS-hosted meetings, further enable strategic dialogue and coordination across services and allied commands (Locher, 2002, p. 248-249).

Use strategic communication to enhance defence institution legitimacy, public trust, and alignment with national priorities (NATO STO, 2024, May, p. 2-37).	Publication of UK and U.S. defence strategies alongside public consultation processes illustrates transparency and strengthens civilian trust in defence planning (HM Government, 2023, March, pp. 33, 36, 43; U.S. DoD, 2022, October 27, pp. 6, 11, 14–16).

4.2.3 Integrating cultural change and innovation

The complexity of defence transformation demands a balanced approach between cultural evolution and institutional innovation. Cultural change ensures behavioural alignment, while innovation catalyses adaptability and responsiveness.

Table 12 synthesises literature-based recommendations and corresponding empirical practices aimed at fostering jointness and driving innovation across defence organisations.

Table 12 – Integrating cultural change and innovation to drive defence transformation

Solutions from literature	Empirical illustrations
Promote the creation of a joint culture to enable integrated planning and operational effectiveness (Snider, 1996, p. 26).	The National Defense University (NDU) Press (n.d.) and its publishing arm, NDU Press, actively promote joint culture by educating national security professionals through cross-service publications and JPME. NORDEFCO illustrates cultural affinity in joint strategic action (NATO STO, 2024, p. 2-36).
Reform promotion and reward mechanisms to recognise joint contributions and align incentives with cross-service goals (Defense Innovation Board, 2024, July 5, p. 6).	Title IV of the GNA established a mandatory framework prioritising joint personnel management by making joint duty experience essential for promotion to senior military ranks (Schaefer et al., 2020, pp. 40–44).
Encourage personnel exchanges and embed service members into joint project teams to reduce bias and enhance collaboration (Lyle, 2019, August 5, p. 4: NATO STO, 2024, May, p. 2-36).	The U.S. DoD's Military Personnel Exchange Program places service members in allied and partner forces to enhance interoperability and foster institutional cooperation through shared operational experience (David, 2019, pp. 33–34).
Diagnose innovation capability gaps and establish academic-industry partnerships to address institutional barriers (Schlueter et al., 2025, p. 28).	NATO's DIANA and UK's Defence and Security Accelerator (DASA) foster partnerships with academia and industry to tackle capability gaps, accelerating innovation in defence applications (HM Government, 2023, March, p. 41; NATO, n.d.-c; DASA, n.d.).
Use risk-reward frameworks and reformed procurement to support agile and cost-effective capability development (Schlueter et al., 2025, p. 28).	The U.S. DoD's application of Other Transaction Authority contracts has facilitated more agile procurement, particularly for software and autonomous systems. For instance, the development and fielding of the Mine-Resistant Ambush Protected vehicle progressed from research and development to production in just 90 days—significantly faster than the typical 18- to 24-month timeline under the Federal Acquisition Regulation (FAR) and Defense FAR Supplement processes (Dobriansky & O'Farrell, 2018, July, pp. 51–52).
Evaluate capabilities based on operational need and global demand to avoid overinvestment in bespoke platforms (Schlueter et al., 2025, p. 15).	The U.S. Navy's Fifth Fleet leveraged commercial and off-the-shelf technologies, such as maritime robotics and AI, integrating these into operational environments through innovative models like "capability as a service" and "capability sprint" (Atlantic Council, 2024, January, p. 18).

Adopt MOSA and implement iterative development cycles based on user feedback (Schlueter et al., 2025, p. 15).	The U.S. Air Force, Army, and Navy apply MOSA standards—such as the Air Force's Open Mission Systems, the Army's Technical Reference Model, and the Navy's tiered governance—to support modular integration and iterative system refinement based on operational needs (Zimmerman et al., 2019, p. 380).
Define governance frameworks for AI integration, supported by digital upskilling and infrastructure modernization (Schlueter et al., 2025, p. 18).	In 2017, U.S. Northern Command collaborated with the Defense Innovation Unit (DIU) to develop the Joint Effects for Real-time Integrated Command and Control Operations (JERIC2O) system, using an agile, governance-driven process that prioritised live demonstrations over traditional proposals. By employing flexible evaluation criteria and Other Transaction authorities, DIU enabled rapid, iterative development and deployment of tools for real-time intelligence integration (Atlantic Council, 2024, January, p. 23).
Foster informal communities of practice via joint exercises and seminars to share knowledge and build trust (Lyle, 2019, August 5, p. 10; Roud, 2021, p. 10).	Sweden's Combined Joint Staff Exercise fosters shared understanding through collaborative problem-solving (Hedlund et al., 2015, pp. 180–181).
Utilise the KIM model to enhance technology transfer and project performance (Briones-Peñalver et al., 2020, pp. 610–611).	Spain's National Institute of Aerospace Technique integrates KIM principles into defence R&D, improving knowledge flows between military and civil sectors (Briones-Peñalver et al., 2020, p. 600).
Transition to open innovation and systems to accelerate capability development and avoid duplication (Stanley-Lockman, 2021, p. 482).	U.S. Navy Task Force 59 adopted a start-up structure focused on actual operational challenges, encouraging wide participation from various innovation partners, which facilitated rapid experimentation, iteration, and deployment of multiple disruptive technologies and maritime robotics (Atlantic Council, 2024, January, p. 19).
Engage non-traditional suppliers and modernise acquisition to include dual-use sectors and digital tools (Schlueter et al., 2025, p. 22).	The U.S. Army's Short-Range Reconnaissance program partnered with the DIU to rapidly procure commercial off-the-shelf drone solutions, achieving faster modernization and enhanced digital innovation (Atlantic Council, 2024, January, p. 20).
Develop collaborative digital platforms and structured protocols for effective virtual teamwork (Swanson et al., 2004, p. 17; Robinson & Morrison, 2009, p. 13).	U.S. Navy Task Force 59 enhanced real-time maritime domain awareness by integrating over twenty million data points from robotics operations, sensors, and satellites into a centralised digital platform. This approach enabled structured collaboration and improved operational effectiveness in multinational exercises (Atlantic Council, 2024, January, p. 19).

4.2.4 Measures and applied practices to foster jointness and operational cohesion

Table 13 synthesises institutional measures and practices aimed at improving interoperability and strategic cohesion through joint education, training, and cross-service integration. Drawing on literature and empirical cases, it highlights the role of JPME, integrated training systems, and interagency exercises in promoting jointness, reducing interservice biases, and enhancing operational performance across domains.

Table 13 – Measures and applied practices to foster jointness and operational cohesion

Solutions from literature	Empirical illustrations
Implement joint education programs to enhance strategic adaptability and interservice collaboration (Cozad et al., 2023, p. 48).	JPME initiatives, such as those offered by the Joint Forces Staff College, aim to mitigate interservice prejudices and promote joint thinking (Davis, 2017, pp. 4, 29–30). The JPME Phase II program fosters joint acculturation by assembling officers from different U.S. military services within a neutral educational setting (Davis & Kienle, 2019, p. 24).
Utilise JDAs to reinforce cross-service cooperation and link joint experience to career advancement (Cozad et al., 2023, p. 61).	The GNA institutionalised JDAs, requiring joint or interagency service for promotion to senior ranks (Locher, 2002, p. 244).
Enhance joint training programs to improve interoperability and operational effectiveness (Cozad et al., 2023, p. 50).	The U.S. Joint National Training System integrates joint concepts, lessons learned, and doctrinal principles into joint training within a Global Joint Training Infrastructure, aiming to prepare forces for a diverse array of operational scenarios (Cozad et al., 2023, p. 50).
Conduct regular joint exercises to enhance collective improvisation capabilities essential for responding to complex military challenges (NATO STO, 2024, May, p. 2-37; Roud, 2021, p. 10).	The U.S. Air Force's 12th Combat Training Squadron conducts up to eleven annual Green Flag exercises simulating joint combat scenarios, involving air-ground coordination and opposition forces to enhance improvisation and interservice cooperation in complex operations (Cozad et al., 2023, p. 91)
Include political and civil leaders in joint courses and exercises to foster mutual understanding (NATO STO, 2024, May, p. 2-37).	The Transregional Capstone Exercise is a strategic-level exercise that enhances U.S. joint operational readiness through simulated crises, emphasizing interagency integration by involving military, political, and civil leaders (Buell et al., 2018, p. 31).

4.2.5 Aligning defence budgets, acquisition systems, and adaptive planning

Table 14 consolidates institutional reform strategies drawn from literature and illustrates their practical application in various national and multinational defence contexts. It highlights how unified budgetary frameworks, centralised funding mechanisms, agile acquisition practices, and strategic planning cycles can foster coherence between capability development and evolving threat environments. The table also reflects the increasing importance of TCO analysis, modularity, and innovation-driven procurement for ensuring sustainable and future-ready defence capabilities.

Table 14 – Budgetary alignment, acquisition reform, and strategic resource management

Solutions from literature	Empirical illustrations
Adopt unified budgetary frameworks aligned with collective defence priorities to reduce interdepartmental resource competition and foster cooperation (NATO STO, 2024, May, p. 2-36).	The UK's Conflict Stability and Security Fund and the Netherlands' Stability Fund enable interdepartmental coordination of defence and foreign policy, with similar models found in the European Defence Fund, the Visegrad Fund, and NATO's Security Investment Programme (NATO STO, 2024, May, p. 2-36).
Institutionalise centralised funding mechanisms to promote capability-based and interoperable investments	The Polish Defence Fund directs public and private investment into dual-use technologies aligned with military priorities, targeting innovative firms and start-ups in areas such as drones,

(Castilla, 2024, pp. 96, 197, 341; Cozad et al., 2023, p. 45; Sempere, 2023, p. 95).	AI, and secure communications (Lawrence, 2024, December 2; Kuppers, 2025, May 5).
Promote joint management initiatives through integrated forums, oversight institutions, and collaborative acquisition programs to enhance strategic unity (Cozad et al., 2023, pp. 45, 52).	Permanent coordination structures like the UK's Stabilization Unit and interdepartmental steering groups in the Netherlands—e.g., "Fragility and Peacebuilding Unit," "Military Operations Steering Group," and "Police/Rule of Law Steering Group"—facilitate integrated planning and policy coherence across military and civil domains (NATO STO, 2024, May, p. 2-36).
Ensure clear delineation of resource-oriented roles and responsibilities via dedicated management bodies (Cozad et al., 2023, p. 52).	The Joint Capabilities Integration and Development System process is used by the U.S. DoD to identify, assess, and prioritise military capability needs and guide the acquisition of defence resources (Mansouri et al., 2022, June, p. 5)
Institutionalise joint acquisition practices using agile, iterative approaches to improve efficiency and responsiveness (U.S. DoD, 2023, August 23, p. 1; Cozad et al., 2023, p. 52).	The Software Acquisition Pathway enables deployment of software solutions within six months through agile methodologies and commercial partnerships (U.S. DoD, 2023, August 23, p. 1).
Align defence acquisition reforms with Defence Organisation's adaptive planning cycles to synchronise modernization with emerging threats (Castilla, 2024, p. 92).	Introduced in 2020, the U.S. Adaptive Acquisition Framework provides flexible acquisition pathways aligned with evolving defence planning, incorporating real-time feedback through initiatives like Project Convergence to accelerate capability development (Defense Acquisition University, n.d.; Center for Strategic and International Studies, 2022, February 16).
Advance institutional reforms to improve fiscal accountability and enable adaptive decision-making (Commission on PPBE Reform, 2024, March 6, pp. 3-4).	The Commission on PPBE Reform (2024, March 6, pp. 3-4) recommends aligning budgets with strategic goals, decentralizing innovation, and adopting modern business systems to enhance fiscal transparency and execution. The European Union (EU) activated the National Escape Clause, which allows Member States to deviate from standard fiscal rules by up to 1.5% of GDP specifically for defence expenditures without triggering excessive deficit procedures (European Commission, 2025, April 30)
Promote cost-effective procurement practices through value-based negotiation frameworks and real-time market intelligence (Schlueter et al., 2025, p. 9).	The M-TADS/PNVS system for the Apache AH-64 helicopter exemplifies effective Performance-Based Logistics (PBL). Through data-driven maintenance forecasting and supply chain optimization, Lockheed Martin reduced sustainment costs and improved parts availability. From 2007 to 2016, successive PBL contracts led to a 10% cost reduction by the third agreement, while consistently surpassing the 85% system availability threshold due to strategic logistics and effective obsolescence management (AlixPartners, 2024, May 9).
Develop adaptable and low-cost defence systems to foster experimentation and innovation in high-intensity conflict preparedness (Panella, 2025, February).	Launched in 2023, the U.S. DoD's Replicator Initiative seeks to deploy large numbers of affordable, modular, and quickly fieldable autonomous systems. Emphasizing commercial tech and rapid prototyping, it promotes experimentation and integration in contested environments to enhance adaptability and resilience for future peer-conflict scenarios (Kahn, 2023, September 20).
Institutionalise TCO analysis early in the acquisition process to ensure long-term sustainability (Schlueter et al., 2025, pp. 9-10).	Northrop Grumman and the U.S. Navy have applied early TCO analysis in major defence programs, such as Nimitz-class carriers, to support life-cycle decision-making. Combined with the MOSA-Competitive framework, this approach enhances interoperability and cost efficiency in systems like the Consolidated Afloat Networks and Enterprise Services contract (Defense Systems, 2011, January 24).

4.2.6 Linking normative recommendations with practice: civilian democratic control of defence

Table 15 synthesises academic recommendations for enhancing democratic civilian control with corresponding empirical illustrations. This juxtaposition reveals how various countries institutionalise oversight, transparency, and civil-military integration, offering insights into persistent challenges and contextual adaptations in democratic defence governance.

Table 15 – Insights into civilian democratic control of defence

Solutions from literature	Empirical illustrations
Establish a clear division of authority between civilian and military institutions to uphold democratic governance (Joó, 1996).	U.S. law mandates civilian control through statutes like 10 U.S. Code §113 and §162, which delineate command authority and confirm Combatant Commanders via the Senate (Congressional Research Service, 2024, January 12; 10 U.S.C., n.d.).
Empower parliamentary oversight mechanisms and ensure military subordination to civil society (Rawal, 2022, p. 143).	U.S. Congress exercises constitutional oversight of the military via Armed Services Committees, annual National Defense Authorization Acts, and hearings with civilian and military leaders (U.S. House Committee on Foreign Affairs, n.d.; U.S. Senate Armed Services Committee, 2024, June, pp. 1–3).
Institutionalise civilian-military consultation structures to align strategic objectives and reduce political-military divergence (Akhlaq, 2024, pp. 115, 121).	Structures like the U.S. National Security Council and Pakistan's National Security Committee promote strategic coordination and reduce civil-military divergence (Akhlaq, 2024, pp. 115, 121; Office of the Law Revision Counsel, n.d.). Nepal's MoD incorporates national security experts and military veterans into policymaking, enhancing informed decision-making (Rawal, 2022, pp. 142–143).
Restructure internal military organisations to directly support civilian strategic leadership (Lyle, 2019, August 5, p. 11).	China's military reforms centralised control under Xi Jinping by dissolving general departments, creating new Central Military Commission agencies, and introducing multi-service theatre commands for joint operations (Li, 2016, p. 24). The Netherlands enhanced civil-military coordination during its Afghanistan mission by embedding interministerial advisors and establishing joint steering groups to align military and foreign policy (van der Lijn, 2015, pp. 76–77).
Strengthen technical capacity and institutional focus of parliamentary defence committees for procurement oversight (Reykers, 2021, p. 521; Auerswald et al., 2023, p. 19).	The UK MoD committed to holding regular Acquisition Hearings—at least twice annually—to provide Parliament with detailed, and when necessary, classified information on major programs. Additionally, the government has adopted a more strategic and systemic approach to acquisition reform, emphasizing early expert input, clearer alignment of expectations and resources, and earlier industry engagement to improve program outcomes and innovation (House of Commons Defence Committee, 2023, pp. 1, 5).
Reinforce shared democratic norms within the military and maintain resilient civilian institutions to preserve democratic decision-making (Kenwick, 2020, p. 73).	Between 2000 and 2003, Croatia curtailed military autonomy, professionalised the defence sector, and enacted legal measures aligning military governance with democratic standards. Despite institutional resistance, these efforts successfully depoliticised the armed forces and enhanced transparency, facilitating Croatia's progression toward NATO and EU membership (Dreisbach, 2016, April, p. 6).

Legally codify mechanisms for civil society engagement and defence transparency to enhance democratic legitimacy (Joó, 1996; NATO STO, 2024, May, p. 2-34).	Lithuania's *Law on the Foundations of National Security* and the *Law on Mobilization and Host Nation Support* formally involve citizens in national defence through training and awareness initiatives. Transparency is further ensured via open data standards, and engaging civil society in resilience and communication efforts (Rogulis, 2025, pp. 64–66).
Address legal ambiguity in defence roles and ensure updated frameworks reflect complex, multi-actor security environments (Joó, 1996; NATO STO, 2024, May, p. 2-35).	In 2022, Lithuania revised its Law on Civil Protection to establish an integrated crisis management system, enhancing coordination across government agencies. Additionally, it developed the National Model for Integrated Crisis Prevention and Hybrid Threats Management, creating a legal and procedural structure for whole-of-government response to diverse threats, including pandemics and hybrid attacks (Bankauskaite & Šlekys, 2023, p. 64).

4.2.7 Bridging sectors for national resilience: Legal and collaborative civil-military innovation

Table 16 outlines integrated defence approaches, particularly in Nordic contexts, that combine legal frameworks, cross-sector coordination, and innovation. These institutional arrangements illustrate how civil-military boundaries are bridged to enhance preparedness and resilience in light of hybrid threats.

Table 16 – Integrated approaches to national security and military-civilian collaboration

Solutions from literature	Empirical illustrations
Adopt a Total Defence framework integrating military and civilian resources (NATO STO, 2024, May, p. 2-33).	Finland's *Security Strategy for Society* integrates civil and military preparedness with national and international partners (Finnish Government, 2025, pp. 66–67).
Strengthen legal frameworks for cross-sector collaboration (NATO STO, 2024, May, p. 2-34).	The Swedish Civil Contingencies Agency (n.d.) enables coordinated crisis response across sectors as outlined in Swedish National security Strategy (Government Offices of Sweden, Prime Minister's Office, 2024. pp. 23, 33, 39, 41).
Promote military-civilian S&T collaborative innovation (Liang et al., 2024, p. 25).	Sweden's National Aeronautics Research Programme (NFFP), administered by Vinnova and governed by stakeholders including the Swedish Defence Materiel Administration (Försvarets materielverk, FMV), fosters civil-military research collaboration and enhances defence R&D (Innovair, n.d.).
Formalise operational coordination structures (Egnell, 2013, p. 251).	In 2022, Sweden restructured its national security governance by creating a National Security Council, appointing a National Security Adviser, and introducing a minister for civil defence. The Foreign Affairs and MoDs were reorganised, and new regional civil defence structures and preparedness sectors were established to enhance crisis readiness (Government Offices of Sweden, Prime Minister's Office, 2024, p. 13).

4.2.8 Synthesis: Institutional reforms to overcome structural barriers

Table 17 consolidates core institutional recommendations to address structural deficits in defence governance, planning, and implementation. These measures are mapped to reform goals across six dimensions.

Table 17 – Institutional reforms to mitigate structural and institutional barriers to effective defence planning

Goal	Institutional reforms
Enhance joint strategy and strategic coherence	Strengthen integrated command structures and joint operational commands to ensure strategic alignment and cross-domain effectiveness. Establish permanent interservice coordination bodies and cross-governmental forums for integrated planning. Restructure the Joint Staff to support strategic design and policy development at the ministerial level. Synchronise objectives across services, allies, and civilian agencies to reinforce integrated deterrence. Develop, maintain, and routinely update joint doctrine to reflect operational needs and evolving threats. Leverage institutionalised lessons learned systems to identify doctrinal gaps and guide future force development and capability planning. Institutionalise the integration of lessons from past operations into policy and planning. Adopt flexible, iterative planning models and establish knowledge platforms to support cross-domain learning. Embed scenario planning, simulations, and wargames in regular strategic development cycles. Align capability development with operational requirements to reduce excessive customisation, improve interoperability, and support joint readiness. Establish interoperable command, control, and communication systems aligned with allied capabilities.
Optimise strategic oversight and resource governance	Create a high-level strategic oversight body (e.g., War Cabinet) accountable to civilian leadership. Codify legal frameworks requiring ministerial authorization for significant military engagements. Empower military leaders to communicate strategic risks and advocate for adequate resourcing. Centralise budgetary frameworks and align them with collective defence priorities. Promote joint acquisition oversight through integrated procurement boards. Institutionalise agile and iterative acquisition mechanisms to improve responsiveness. Implement TCO analysis in early stages of acquisition. Institutionalise acquisition pathway reforms to engage non-traditional suppliers and integrate dual-use technologies through enhanced digital procurement platforms and streamlined regulatory frameworks. Advance fiscal accountability and align acquisition reform with adaptive planning cycles. Establish institutional capacity for value-based defence procurement through negotiation frameworks and real-time market intelligence systems. Clarify institutional roles in defence resource governance by establishing dedicated structures and formal delineation of responsibilities.
Foster joint culture and institutional innovation	Promote joint culture through targeted education, doctrine, and leadership development. Reform promotion and career advancement systems to reward joint service and cross-agency collaboration. Institutionalise personnel exchanges and embed officers in joint and interagency teams. Build structured partnerships with academia and industry to address capability gaps and foster innovation. Develop MOSA and support iterative development cycles. Institutionalise open defence innovation ecosystems through formal partnerships with non-traditional actors to accelerate experimentation, reduce duplication, and scale adaptive capabilities. Establish AI governance frameworks and promote digital transformation through upskilling. Apply KIM to strengthen defence R&D and knowledge transfer.

	Promote informal communities of practice through multinational exercises and joint seminars.
Advance civil-military integration and national security collaboration	Adopt a Total Defence framework integrating military, civilian, and societal resources. Strengthen legal and regulatory frameworks for cross-sector coordination in national security planning. Establish a national defence coordination council with defined leadership roles to align defence planning with inter-ministerial national security priorities. Establish permanent inter-agency coordination bodies for unified crisis response. Promote structured partnerships with civil society, including academia and non-governmental organisations (NGOs). Develop integrated planning processes involving military and civilian stakeholders from the outset. Institutionalise joint training and exercises involving civilian agencies and armed forces. Support civil-military collaboration in innovation through multi-sector research initiatives. Define and update roles, responsibilities, and communication protocols for national security operations.
Reinforce democratic oversight and civilian control	Establish clear divisions of authority between civilian and military institutions. Empower parliamentary oversight bodies with technical capacity and legal mandates. Institutionalise permanent civilian–military consultation frameworks. Restructure military organisations to support strategic civilian leadership and ensure policy alignment. Ensure updated legal frameworks governing defence and national security roles and responsibilities. Codify civil society participation in defence governance through legally binding instruments. Reinforce democratic norms in military education, training, and promotions. Embed accountability mechanisms in strategic planning and operational execution to ensure traceability. Institutionalise strategic communication frameworks to strengthen legitimacy, improve transparency, and ensure defence planning reflects national priorities.
Enhance joint education and interoperability	Institutionalise joint education programs to foster adaptability and interoperability. Establish neutral educational settings to promote joint acculturation among officers. Link career advancement to completion of JDAs. Expand and harmonise joint training programs to improve operational effectiveness. Conduct frequent, scenario-based joint exercises to cultivate cohesion. Institutionalise mechanisms to support flexible multinational task forces and enhance interoperability for coalition-based strategic responses. Include civil and political leaders in joint exercises to build strategic alignment and whole-of-government thinking.

4.3 Institutional and behavioural reforms – Case studies

4.3.1 Belgium: The Agusta–Dassault affair and clientelistic procurement culture

4.3.1.1 Historical and institutional context

The Agusta–Dassault scandal erupted following the 1991 assassination of Socialist leader André Cools. Judicial probing into the murder exposed illicit payments from Agusta (Italy) and Dassault (France) to senior Socialist politicians in exchange for lucrative defence procurement contracts, specifically surrounding the 1988 acquisition of Agusta A109 helicopters and Dassault's modernization of F 16 aircraft (Deschouwer & Deweerdt, 1995,

p. 313; Maesschalck & Van de Walle, 2006, pp. 999, 112; Reykers & Fonck, 2020, pp. 73–74). The revelations rapidly escalated into a high-profile political crisis involving top government figures, with suspicions pointing to deeply embedded clientelism and illegal party financing. The press and public outrage ensured the scandal had enduring national and institutional ramifications (De Winter, 2003, p. 96; Deschouwer & Deweerdt, 1995, p. 314; Maesschalck & Van de Walle, 2006, p. 999; Reykers & Fonck, 2020, p. 73).

Despite subsequent alignment of procurement planning with NATO capability targets, persistent institutional capacity constraints—particularly in procurement staffing, technical expertise, and project management—have undermined enforcement of cost and schedule discipline in major programs. Issues persist in the delivery of operational capabilities, contractor oversight, and long-term financial planning (Chambre des représentants de Belgique, 2023, October 31, p. 48; Court of Audit of Belgium, 2025, May 28, p. 20; De Neve, 2022, p. 161; Egmont Institute, 2021, November 10).

4.3.1.2 Salient dysfunction(s)

- Personal Ambition & Rivalry – Coalition politics, service rivalries, and hierarchical exclusion fostered sycophancy, reduced team cohesion, and sidelined merit-based decision-making. Patronage appointments in procurement structures often reflected political loyalty over competence (Reykers & Fonck, 2020, pp. 67, 72, 78; Maesschalck & Van de Walle, 2006, pp. 1007–1008).
- Cognitive & Institutional Bias – Groupthink, status quo bias, and heuristic shortcuts limited critical scrutiny. Parliamentary committees, with insufficient technical expertise, were often unable to challenge executive procurement narratives, leading to over reliance on narrow perspectives (Reykers, 2021, pp. 507, 518; Reykers & Fonck, 2020, pp. 69, 72).
- Information Manipulation – Patterns of selective disclosure, opaque reporting, and unclear disclosure norms restricted informed legislative oversight and public scrutiny of procurement decisions (De Winter, 2003, pp. 101–105; Reykers & Fonck, 2020, p. 72).
- Rent-Seeking – Longstanding ties between political actors and elements of the domestic defence industry created risks of demand inflation, collusion, and distorted procurement priorities (De Winter, 2003, pp. 98-102, 104; Maesschalck & Van de Walle, 2006, pp. 1007–1008).

- Corruption – The Agusta–Dassault affair epitomised illicit exchanges between private contractors and political elites, facilitated by opaque contracting processes, weak enforcement, and discretionary authority (Deschouwer & Deweerdt, 1995, p. 313).

4.3.1.3 Mapping of reforms

Institutional / Structural Solutions

- Merit-based career advancement systems and formal evaluation frameworks introduced in Belgian Defence services to curb patronage (Brans & Hondeghem, 2005, p. 827; EUROMIL, 2024).
- Judicial strengthening with lifting of parliamentary immunity and successful prosecution of key political figures involved in corruption scandals. Judge Ancia's investigation resulted in the indictment and referral to the Court of Cassation for figures such as Guy Coëme, Guy Spitaels, and Guy Mathot. Forced ministerial resignations followed exposure to formal charges (Deschouwer & Deweerdt, 1995, p. 313).
- Special commissions scrutinised procurement processes, debated the adequacy of oversight, and called for lifting immunities (De Winter, 2003, p. 103; Deschouwer & Deweerdt, 1995, pp. 314–315). A dedicated parliamentary committee for defence acquisitions was established later to allow access to classified information and regularise procurement scrutiny (Lagassé & Saideman, 2019, pp. 10–11; Reykers, 2021, p. 511).
- Significant tightening of party finance regulations, mandated public funding of parties, and stricter campaign expense controls—targeted at limiting grey money and opaque influence over procurement decisions (De Winter, 2003, p. 101; Maesschalck & Van de Walle, 2006, p. 1008).
- Proposals emerged for greater ex ante involvement by the Court of Audit, though evidence for immediate, operational audit reform in procurement oversight is mixed (Lagassé & Saideman, 2019, pp. 10–11).
- Partial implementation of federal e-procurement tools to enhance contract traceability, constrained by national security exemptions in defence procurement (Christiaens & De Weser, 2025, April 3; European Commission, 2024, p. 10).

Behavioural / Leadership Interventions

- Emphasis on transformational and shared leadership styles to improve team cohesion, foster openness, and counter sycophancy and exclusion (Dupont, 2023, February; The Brussels Times, 2025, June 9).
- Introduction of recognition mechanisms valuing individual and team contributions to sustain motivation (e.g., Meritorious Service Medal) (Dupont, 2023, February; Meritorious Service Medal [Belgium], n.d.).
- Initiatives to raise awareness and mitigation of cognitive biases through training, and scenario exercises (RECOBIA Consortium, 2015).
- Sustained investigative journalism and a public demand for transparency forced resignations and applied reputational costs, undermining former norms of elite immunity (De Winter, 2003, pp. 101, 103–105; Deschouwer & Deweerdt, 1995, pp. 313–314; Maesschalck & Van de Walle, 2006, pp. 999, 1001; Reykers & Fonck, 2020, p. 73).
- The Socialist Party introduced new moral guidelines and attempted structural reforms to restore internal discipline (Deschouwer & Deweerdt, 1995, p. 325).
- Professionalisation efforts expanding ethics and contract management training for procurement personnel (European Commission, n.d.).
- Establishment of anonymous whistleblowing channels aligned with EU standards to protect disclosures and reduce fear of reprisal (CMS Law, 2023).

4.3.1.4 Enabling / constraining factors

Enabling factors

- Judicial Independence: The judiciary's willingness to pursue politically sensitive cases enabled accountability (Deschouwer & Deweerdt, 1995, pp. 314–315).
- Media Pressure: Sustained public attention kept momentum for reform alive (De Winter, 2003, pp. 101, 103-105; Deschouwer & Deweerdt, 1995, pp. 313-314; Maesschalck & Van de Walle, 2006, pp. 999, 1001; Reykers & Fonck, 2020, p. 73).

Mixed factors

- EU/NATO External Norms: While encouraging institutional transparency, these norms lacked enforcement leverage (Reykers, 2021, pp. 507, 518).

Constraining factors

- Parliamentary Immunity: Legal safeguards for officials initially slowed reform (De Winter, 2003, pp. 94–95; Deschouwer & Deweerdt, 1995, pp. 314–315).

- Civil–Military Expertise Gap: Parliament's limited technical capabilities hindered effective oversight (Reykers, 2021, pp. 507, 518; Reykers & Fonck, 2020, pp. 69, 72).
- Persistent Clientelism: Patronage networks curtailed systemic reform (De Winter, 2003, pp. 98-102, 104; Maesschalck & Van de Walle, 2006, pp. 1007-1008; Reykers & Fonck, 2020, pp. 67, 72).
- National security justifications: Security exemptions weakened disclosure regimes (Reykers, 2021, p. 521; Reykers & Fonck, 2020, pp. 69, 72).
- Institutional Capacity Deficits: Limited numbers of trained procurement officers and delays in modernising project management processes impeded the translation of NATO-aligned plans into timely, cost-effective delivery**.**

4.3.1.5 Observed outcomes

Transparency

- Oversight Mechanisms: New or reformed parliamentary commissions and ad hoc investigative processes to examine defence procurement. However, ex ante audit intervention by the Court of Audit was discussed more than enacted in practice (Reykers, 2021; Lagassé & Saideman, 2019, pp. 10-11).
- Policy Changes: Laws on party financing passed; campaign spending was capped and monitored; proposals for procurement transparency increased (De Winter, 2003, p. 101; Maesschalck & Van de Walle, 2006, p. 1008).

Accountability

- Elite Norms: Resignations of senior political figures (Deschouwer & Deweerdt, 1995, pp. 313-314) represented a notable, but short-lived, break from past impunity. Evidence that old clientelist/elite protection habits continued to stifle full reform and accountability (De Winter, 2003, pp. 101-102, 104).
- Integrity Gains: Temporary improvement in public confidence. Yet interviews suggest that most politicians and observers saw key parties reverting to established practices as soon as public attention faded (De Winter, 2003, pp. 104-105).

Effectiveness

- Cost Containment & Capability Outcomes: Since 2017, Belgium has aligned F-16 capability goals with available pilots, but pilot shortages and limited aircraft have reduced engagement capacity, and frequent operations over the past decade have lowered readiness, while NATO's requirements have risen. NH90 helicopters have

lower availability, delayed maintenance, and a postponed readiness deadline. The fleet's limitations heavily impact operations, and the MoD needs an extra NFH aircraft to meet mission goals (Court of Audit of Belgium, 2019, December 4, p. 86). Parliamentary and audit mechanisms remained limited in real capacity to affect project outcomes, largely due to ongoing expertise and transparency gaps, as well as continued use of national security justifications for secrecy (Reykers, 2021, pp. 518, 521; Reykers & Fonck, 2020, pp. 69, 72).

- Reduced Collusion: Although party financing laws curtailed the most egregious practices, modes of informal collusive arrangement adapted to new rules as evidenced in subsequent procurement controversies (De Winter, 2003, pp. 101-102, 104).

4.3.1.6 Analytical assessment

The Belgian Agusta–Dassault episode demonstrates how structural reforms and behavioural interventions interact in addressing procurement dysfunctions, but also how deep-seated political culture and institutional capacity constraints limit reform durability. Using the framework of five core dysfunctions (table 5), the case reveals partial but uneven progress.

- Personal Ambition & Rivalry was constrained through merit-based career systems and the judicial prosecution of senior political elites. Yet coalition politics and patronage networks remained resilient, showing that while judicial independence can correct individual abuses, structural patronage is harder to dismantle.
- Cognitive & Institutional Bias was partially mitigated by new parliamentary committees and external oversight mechanisms. However, persistent expertise gaps limited the ability of legislators to contest executive narratives, underscoring that structural checks without technical capacity cannot fully counter entrenched biases.
- Information Manipulation was reduced by tighter campaign finance laws, investigative journalism, and gradual e-procurement adoption, which increased transparency of party financing and contracting. Nevertheless, national security exemptions continued to provide cover for selective disclosure, showing the limits of procedural reforms in sensitive defence domains.
- Rent-Seeking was curbed by stricter party finance rules and public funding of political parties, reducing the scope for opaque contractor influence. Still, informal

collusion adapted to new regulations, demonstrating the resilience of clientelistic practices in shaping procurement outcomes.

- Corruption was confronted most directly: judicial action led to resignations, prosecutions, and unprecedented accountability for senior figures. Yet, evidence of reversion to clientelism after public attention waned highlights how cultural norms of impunity reassert themselves once immediate crisis pressure fades.

Overall, Belgium's case illustrates that structural reforms (judicial strengthening, parliamentary commissions, campaign finance regulation, digital procurement tools) and behavioural/leadership interventions (transformational leadership, ethics training, whistleblowing protections, and public scrutiny) worked in tandem to enhance transparency and accountability. However, their effectiveness was constrained by enduring patronage networks, expertise shortfalls, and security exemptions.

The outcome confirms the broader insight that formal structures alone cannot secure sustainable reform. Belgium's experience shows that dual-track strategies—embedding legal/judicial safeguards while simultaneously fostering behavioural change, bias-awareness, and leadership accountability—are necessary but still insufficient without deeper cultural transformation. Durable progress in defence procurement governance requires moving beyond episodic crisis-driven reforms to institutionalising contestability, professionalisation, and open decision-making as everyday norms.

4.3.2 Canada: The Joint Strike Fighter controversy and procurement dysfunction

4.3.2.1 Historical and institutional context

Canada's defence procurement system is marked by persistent delays, escalating costs, and complex bureaucratic processes. The controversy over Canada's engagement with the Joint Strike Fighter (JSF) program intensified in 2010 when the federal government committed to acquiring 65 Lockheed Martin F-35 fighters without a formal open competition (Byers & Webb, 2011, p. 217; MacMillan, 2018, p. 136). Initial justifications centred on interoperability with U.S. and NATO allies, anticipated industrial participation for Canadian firms, and access to next-generation capabilities. However, mounting public, parliamentary, and Auditor General scrutiny began to question a lack of transparency, absence of a competitive tender, absence of assessments on future operational needs, and undisclosed cost and risk data (Hoeffler & Mérand, 2015, pp. 1–3; Office of the Auditor General of Canada, 2012, pp. 10-11, 16–19).

In 2023, the Liberal government finalized a $19 billion contract for 88 F-35 jets, but the process remains under scrutiny and subject to political contestation. Canada's top independent watchdog warned that procurement costs could be at least 45% higher than originally estimated and flagged a serious pilot shortage as a risk to engagement capacity (Ljunggren, 2025, August 7). Added to this, fiscal constraints, public ambivalence toward defence spending, and ageing infrastructure continue to complicate procurement governance (Jackson, 2025, May 10).

4.3.2.2 Salient dysfunction(s)

- Personal ambition & rivalry – Political executive dominance has shaped Canadian defence procurement, with patronage risks and hierarchical decision-making structures narrowing interagency and cross-party contestation. These dynamics contributed to the entrenchment of certain acquisition priorities and reduced the space for dissenting views (Byers & Webb, 2011, p. 218; MacMillan, 2018, pp. 147–150).
- Cognitive & institutional bias – Major procurement projects, most notably the F-35, were undermined by optimism bias in cost, schedule, and capability forecasts; confirmation bias that privileged supportive evidence while discounting contrary assessments; and path dependency reinforced by bureaucratic momentum and alliance interoperability pressures, especially with the U.S. These biases, compounded by inadequate internal debate and dissent, allowed flawed assumptions to persist, weakening challenge functions and reducing institutional capacity for self-correction (MacMillan, 2018, p. 150; Migone et al., 2023, pp. 76–77; Office of the Auditor General of Canada, 2012, pp. 11, 24–26, 30–31).
- Information manipulation – It was uncovered that statements of operational requirements had been shaped in a way that favoured the F-35, narrowing the field and foreclosing a proper competition (Byers & Webb, 2011, p. 218; MacMillan, 2018, pp. 155; Migone et al., 2023, pp. 6, 60, 78; Office of the Auditor General of Canada, 2012, pp. 1-2, 8, 19, 23, 30).
- Rent-seeking – Producer and contractor lobbying, paired with complex offset agreements, led to allocative inefficiencies and collusive risks, particularly in multinational and high-value equipment procurements (Heinrich, 2015, p. 353; Rendon & Rendon, 2016).

- Corruption – While Canada has largely avoided the high-profile defence corruption scandals seen in some allied countries (Transparency International, 2024, p. 2), significant risks remain beneath the surface (Transparency International Defence & Security, n.d.).

4.3.2.3 Mapping of reforms

Institutional / structural solutions

- Following auditor investigations and sustained parliamentary scrutiny, the procurement process was suspended in 2012, opening space for corrective reforms (MacMillan, 2018, p. 154).
- Oversight shifted to a newly created National Fighter Procurement Secretariat (NFPS) within Public Works to centralize and depoliticize the review process (Hoeffler & Mérand, 2015, p. 2; Migone et al., 2023, p. 77).
- The government established independent review panels, involved the Auditor General and the Parliamentary Budget Officer for financial assessments, and mandated new procedures for verifying costs and comparing alternatives (MacMillan, 2018, pp. 19, 136, 151-152; Migone et al., 2023, pp. 76–77, Office of the Auditor General of Canada, 2012).
- Government reporting on industrial participation was systematised to provide public documentation of Canadian firms' involvement and earned industrial benefits from JSF programme work (Innovation, Science and Economic Development Canada [ISED], n.d.).
- Federal lobbying registry and donation transparency have been incrementally strengthened (Office of the Commissioner of Lobbying of Canada, 2025).

Behavioural / Leadership Interventions

- The institutional reforms outlined above included a key behavioural component: the transfer of authority to a cross-departmental body— NFPS—mandated to review operational requirements with greater objectivity. This structural shift was designed to broaden institutional perspectives, reduce advocacy bias, and mitigate the "agent intrusion" effect, whereby internal actors unduly influence technical justifications to support preselected outcomes.
- Additionally, essential documentation—including projected benefits for industrial participation, key phases and steps in project management, estimated costs, and assessment criteria—was released or publicly summarised, enabling independent

experts and media scrutiny (see Office of the Auditor General of Canada, 2012, pp. 16-16, 20, 27-34). This transparency allowed for external validation and helped to detect whether requirements had been manipulated to favour a specific outcome.

4.3.2.4 Enabling / constraining Factors

Enabling factors

- Auditor and budget oversight: The Auditor General and the Parliamentary Budget Officer provided independent scrutiny that exposed procedural flaws and enabled the 2012 procurement reset (Hoeffler & Mérand, 2015, p. 2; MacMillan, 2018, pp. 136, 154; Migone et al., 2023, pp. 76–77, Office of the Auditor General of Canada, 2012, pp. 30-31).
- Parliamentary and media scrutiny: Sustained legislative hearings and media coverage elevated public salience and pressured policy correction (Byers & Webb, 2011, p. 224; MacMillan, 2018, pp. 39, 52, 148–149, 151, 165-166; Migone et al., 2023, p. 7).

Mixed factors

- Industrial benefits: Significant Canadian industrial participation deals created domestic constituency support for the JSF that reinforced path dependency, even as they did not fully offset transparency concerns (Industry Canada, 2014, pp. 5–6).

Constraining factors

- Political executive control: The executive's dominance over strategic procurement decisions limited the space for interagency contestation and cross-party oversight in early phases (Byers & Webb, 2011, p. 218; MacMillan, 2018, pp. 20–21; 147-150).
- Alliance pressures: Political and military imperatives to remain interoperable with the U.S. and other NATO partners compressed decision space and contributed to preferences for platform continuity (Hoeffler & Mérand, 2015, pp. 2–3; MacMillan, 2018, p. 48; Office of the Auditor General of Canada, 2012, p. 11).
- Organisational culture: Internal optimism and information siloing within the Department of National Defence (DND) weakened internal challenge mechanisms and reduced contestability (Byers & Webb, 2011, p. 218; MacMillan, 2018, pp. 150, 155; Office of the Auditor General of Canada, 2012, p. 19).
- Public ambivalence: Public ambivalence regarding defence spending creates inconsistent reform momentum (Jackson, 2025, May 10).

4.3.2.5 Observed outcomes

Transparency

- Requirement for transparent costing: Greater reliance on independent budgetary projections reduced the risk of systematic cost underestimation (Hoeffler & Mérand, 2015, p. 2; Migone et al., 2023, p. 7).
- Information asymmetry partially reduced: Independent reviews and the public spotlight mitigated, though did not entirely eliminate, entrenched biases and information manipulation in DND and government communications (MacMillan, 2018, p. 154-155).

Accountability

- Strengthened oversight: The suspension of the sole-source process and the creation of an independent secretariat re-established procedural disciplines around major defence acquisitions (Hoeffler & Mérand, 2015, p. 2; MacMillan, 2018, pp. 153–154).
- Week implementation: In practice, comprehensive personnel ethics standards are frequently undermined by weak implementation and inconsistent enforcement—a problem compounded by known limitations in the military justice system and underdeveloped whistleblower protections. Furthermore, a pattern of "defence exceptionalism" often shields procurement and financial management practices from regular scrutiny and transparency requirements, allowing for greater discretionary authority and opacity than would typically be accepted in other public sectors (Transparency International Defence & Security, n.d.).

Effectiveness

- Delays and capability gaps: The suspension of the procurement process led to substantial delays, necessitating the extension of the ageing CF-18 fleet and contributing to ongoing uncertainty surrounding Canada's future fighter capability (MacMillan, 2018, pp. 152–163). Although Canada eventually re-entered a competitive selection process, the protracted timeline required interim measures to sustain operational readiness. As part of this mitigation strategy, Canada undertook a series of upgrades to extend the service life of the CF-18s and, between 2019 and 2021, acquired 25 used F/A-18A/B Hornet aircraft from Australia to supplement its existing fleet (TsAMTO, 2021, April 12). In 2022, the Canadian government selected the F-35A as the preferred solution under the Future Fighter Capability Project

(FFCP) for the procurement of 88 new aircraft. It formally requested the delivery of the first nine fully operational F-35 jets by 2027. However, observers remain sceptical about the feasibility of this timeline, given past procurement delays and ongoing programmatic risks (Migone et al., 2023, p. 81).

- Industrial benefits: While Canadian firms gained substantial production and sustainment contracts, further work remains contingent on Canada's continued participation in the F-35 programme (Congressional Research Service, 2022, May 2, p. 33; Industry Canada, 2014, pp. 5–6).

4.3.2.6 Analytical assessment

The Canadian JSF episode demonstrates the interplay of structural reforms (NFPS creation, audit involvement, transparency mandates) and behavioural interventions (external scrutiny, cross-departmental review, publication of cost data) in correcting procurement dysfunctions. In terms of the analytical framework (table 5):

- Personal ambition and rivalry were partially mitigated through meritocratic oversight and redistribution of authority, though executive dominance remained entrenched.
- Cognitive and institutional biases were addressed by embedding independent review and external challenge functions, aligning with recommended practices such as peer review and institutionalised dissent. However, path dependency sustained by alliance imperatives limited alternative consideration.
- Information manipulation was curbed by transparency measures and NFPS review, illustrating the effectiveness of structural and behavioural safeguards when combined.
- Rent-seeking risks persisted, as lobbying and industrial offsets continued to shape decision-making, highlighting the need for stronger e-procurement and incentive-compatible contracting.
- Corruption risks were mitigated by transparency reforms and independent oversight, but vulnerabilities remained due to discretionary authority and fragmented accountability structures.

Overall, Canada's case illustrates both the promise and limits of procedural reforms. Structural fixes enhanced transparency and accountability, but their impact was constrained by enduring cultural, political, and alliance pressures. This supports the broader insight from the theoretical framework that durable reform requires dual-track strategies: embedding

legal and institutional safeguards while cultivating behavioural change through leadership, bias-awareness, and a culture of open dissent.

4.3.3 Austria: The Eurofighter Typhoon procurement and reform dynamics

4.3.3.1 Historical and institutional context

Austria's defence procurement tradition is rooted in its post–Cold War neutrality and low-profile defence posture. Major acquisitions have typically reflected a cautious, consensus-driven approach bounded by political conflict-avoidance and fiscal constraints. The 2002 decision to procure Eurofighter Typhoon jets—ultimately a €2 billion contract for 24 aircraft—sparked immediate controversy due to its scale, perceived lack of transparency, and opaque offset and industrial participation arrangements (Mader, 2022). Subsequent reductions brought the order to 18, then 15 aircraft, influenced by both political pressure and fiscal austerity after the 2002 European floods (GlobalSecurity.org, n.d.; World Peace Foundation, 2020/2023).

Parliamentary inquiries, media *exposés*, and an eventual defence ministry investigation alleged the state was deliberately misled, both on pricing and industrial offset arrangements (BBC News, 2017; Defense Industry Daily, 2020). In 2017, after further revelations, the Austrian MoD lodged a civil lawsuit against Airbus and the Eurofighter consortium, seeking €1.1 billion in damages connected to claims of fraudulent deception and price misrepresentation (BBC News, 2017).

4.3.3.2 Salient dysfunction(s)

- Personal ambition & rivalry – Internal conflicts between political leaders, senior defence officials, and ministerial figures shaped key phases of the purchase. High-level rivalries (notably involving Finance Minister Grasser and other decision-makers) introduced politicisation and fostered a climate where procurement priorities were tightly associated with individual or party agendas. Top officers (e.g., Air Chief Erich Wolf) and their close associates played pivotal roles—sometimes blending personal and institutional interests—which reduced team cohesion and enabled sycophantic behaviour among subordinates wary of challenging the dominant coalition. Opaque reporting lines and tolerance for "private business" among officials signalled the fragility of merit-based professional norms within the defence bureaucracy (World Peace Foundation, 2020/2023).

- Cognitive & institutional bias – Evidence from the Parliamentary Task Force and multiple audits shows that contract evaluation and requirement-setting were dominated by groupthink: technical merits were often secondary to a narrative of "modernisation at any cost," and cost/benefit analyses were built to justify politically favoured outcomes. External experts and critical voices, both from within the military and the civilian administration, were typically excluded or overridden, fostering an unhealthy confirmation bias and an institutional reluctance to revisit questionable assumptions or address warning signs as the deal progressed (Federal MoD, Austria, n.d.; World Peace Foundation, 2020/2023).
- Information manipulation – The contract was structured and communicated to support a prescriptive procurement path, with requirements written in a manner that foreclosed competition (World Peace Foundation, 2020/2023). Selective disclosure of cost data and technical details limited the information available both to Parliament and to the broader public. Task Force Eurofighter and associated investigations found that key contract terms—and the reasons for offsets—were either omitted outright or presented to decision-makers in misleading form (Federal MoD, Austria, n.d.) This deliberate control over information held by a small circle of officials and political operatives was central to the deal's final shape (World Peace Foundation, 2020/2023).
- Rent-seeking – The Eurofighter offset program became an archetype for rent-seeking: offset deals were intentionally opaque, with intermediaries, business agents, and companies (notably the Magna Group, Frank Stronach, and various PR/lobbying networks) positioned to extract value via supply contracts and investments unrelated to operational defence needs. This institutional fragmentation—compounded by weak oversight—allowed agents, contractors, and certain firms to manipulate procurement flows, stoking both price inflation and allocative inefficiency. In 2023, former Magna managers remained under investigation for money laundering associated with the deal (World Peace Foundation, 2020/2023).
- Corruption – Austrian, German, and other investigations revealed a wide spectrum of corrupt practices: kickbacks, bribes, and disguised commissions routed via intermediary networks (e.g., Steininger, Mensdorff-Pouilly), along with evidence of wilful deception and fraud in both the main contract and offset administration (World Peace Foundation, 2020/2023). While no major Austrian criminal case has resulted

in convictions to date (with courts citing evidence gaps), German investigations led to fines for Airbus due to "failure of supervisory duty" (noting multi-million-euro payments for "unclear purposes") (Deutsche Welle, 2020, November 12). The government's civil suit against Airbus for €1.1 billion argued damages by wilful deception, inflated prices, and hidden payments, supported by findings from the Eurofighter Task Force's five-year probe (BBC News, 2017).

4.3.3.3 Mapping of reforms

Institutional / structural solutions

- In response to evidence of deception and possible fraud, the Austrian MoD commissioned investigative task forces, opened new criminal and civil proceedings (notably the €1.1 billion suit against Airbus/Eurofighter in 2017), and collaborated with German and EU authorities for cross-border investigations (BBC News, 2017; Deutsche Welle, 2020, November 12; Keppel, 2022; World Peace Foundation, 2020/2023).
- Parliamentary committees of inquiry gained expanded powers in 2015, enabling minority-driven investigations that increased transparency and public scrutiny (Keppel, 2022).
- The MoD revised its rules for procurement reporting, internal audits, and offset deal disclosure, although effectiveness was limited by ongoing secrecy and incomplete enforcement mechanisms (GlobalSecurity.org, n.d.; Heinrich, 2015, p. 353).
- Accession to EU anti-corruption and procurement rules helped drive some alignment with best practice for transparency, tendering, and offsets, and facilitated international investigation into cross-border offset arrangements (GAN Integrity, 2020).

Behavioural / leadership interventions

- The public exposure of Air Chief Erich Wolf's undisclosed side business and entanglements with EADS lobbyists (and similar revelations about political and ministry figures) underscored the need for clearer internal controls, stricter conflict-of-interest policies, and a culture of objection to inappropriate practices (GlobalSecurity.org, n.d.; World Peace Foundation, 2020/2023).
- Sustained media attention and investigative journalism became an indirect accountability lever, keeping political and MoD actors under pressure and

empowering reform-minded parliamentarians and activists (BBC News, 2017; GlobalSecurity.org, n.d.).

- Following the revelations of the scandal, senior MoD officials and leaders on parliamentary inquiries publicly recognised the importance of integrity, greater transparency in vendor engagement, and the need for revised approach to procurement ethics standards (Federal MoD and Sports, Austria, 2017, February 16; GlobalSecurity.org, n.d.; World Peace Foundation, 2020/2023).
- Limited efforts were made to professionalise procurement roles, strengthen ethics training, and provide scenario-based oversight, but these were often ad hoc, inconsistently applied, and subject to reversal or dilution during changes in political leadership (Cramer & Franke, 2021, June 28; OECD Working Group on Bribery, 2024, pp. 22–23).

4.3.3.4 Enabling / constraining Factors

Enabling factors

- Public and political dissatisfaction: The Eurofighter scandal provoked widespread disillusionment across party lines, the public, and civil society, creating sustained pressure for parliamentary action, procedural reforms, and increased transparency in procurement decisions (Federal MoD and Sports, Austria, 2017, February 16; BBC News, 2017; Defense Industry Daily, 2020; GlobalSecurity.org, n.d.).
- EU membership and external pressure: Austria's EU membership catalysed the adoption of stricter procurement and anti-corruption standards, provided access to comparative best practices, and facilitated cross-border investigation into complex offset arrangements (GAN Integrity, 2020; OECD Working Group on Bribery, 2024, p. 28)
- Legal actions: The MoD created investigative task forces and initiated criminal and civil proceedings against corporate actors, including the 2017 civil lawsuit against Airbus and the Eurofighter consortium (BBC News, 2017; Deutsche Welle, 2020, November 12).
- Parliamentary oversight was reinforced with expanded committee powers instituted in 2015 to allow for minority-driven investigations and increased transparency of procurement decisions (Keppel, 2022).

- Media and civil society organisations maintained sustained coverage and critical scrutiny of the procurement case, resulting in indirect accountability pressure on officials and contractors (BBC News, 2017; GlobalSecurity.org, n.d.).

Constraining factors

- Rent-seeking and fragmented responsibility: The procurement process exhibited rent-seeking and fragmented responsibility, as multiple government agencies, armed forces, and contractors held overlapping mandates with weak coordination (GlobalSecurity.org, n.d.).
- Civil-military tensions and neutrality: Austria's longstanding policy of neutrality and internal political disagreements impeded ambitious reforms and fostered a cautious approach to military procurement (BBC News, 2017; Mader, 2022; Molnár, 2020).
- Oversight capacity shortcomings: Technical and institutional shortcomings were evident in the regulation and auditing of international offset agreements (Heinrich, 2015, p. 353).
- Institutional resistance: Elements within the defence bureaucracy and political elites who were involved in the original procurement opposed reforms or attempted to limit their impact (GlobalSecurity.org, n.d.; Mader, 2022; Mader, 2024).
- Limited training: Professionalisation and ethics training in procurement roles were only partially and inconsistently implemented, and efforts were subject to interruption by changes in political leadership (Cramer & Franke, 2021, June 28; OECD Working Group on Bribery, 2024, pp. 22–23).

4.3.3.5 Observed outcomes

Transparency

- Enhanced parliamentary oversight: Parliamentary committees received expanded investigatory powers in 2015, enabling more thorough reviews of procurement practices and offset agreements. Minority-driven inquiries contributed to increased transparency and public scrutiny of the Eurofighter deal (GlobalSecurity.org, n.d.; Keppel, 2022).
- Procurement and audit reforms: The MoD implemented new reporting protocols and audit processes, which included more detailed disclosure of offset contracts (GlobalSecurity.org, n.d.; Heinrich, 2015, p. 353). Despite these measures, transparency was constrained by continued secrecy, limited enforcement, and

technical complexity in overseeing multinational agreements (Heinrich, 2015, p. 353).

- Media and civil society vigilance: Persistent coverage and investigation by journalists and civil society sustained pressure on defence officials, functioning as informal watchdogs and promoting public awareness (BBC News, 2017; GlobalSecurity.org, n.d.).

Accountability

- Legal and investigative actions: Austria launched multiple task forces and criminal investigations, and pursued civil litigation—including a €1.1 billion damages suit against Airbus—citing fraudulent misrepresentation. Cooperation with German and EU authorities revealed irregular payments and corrupt practices (BBC News, 2017; Deutsche Welle, 2020, November 12; World Peace Foundation, 2020/2023). However, criminal prosecutions were ultimately dropped due to insufficient admissible evidence, limiting criminal accountability (Defense Industry Daily, 2020; GlobalSecurity.org, n.d.).
- Normative shifts toward integrity: Exposure of conflicts of interest, such as lobbying ties of Air Chief Erich Wolf, heightened awareness of ethical standards (GlobalSecurity.org, n.d.; World Peace Foundation, 2020/2023). Parliamentary leaders increasingly endorsed integrity controls and transparent vendor engagement (Federal MoD and Sports, Austria, 2017, February 16).
- Limited professionalisation: Efforts to professionalise procurement cadre and provide ethics training were initiated but remained inconsistent, sometimes undermined due to shifting political priorities and lack of institutionalization (Cramer & Franke, 2021, June 28; OECD Working Group on Bribery, 2024, pp. 22–23).

Effectiveness

- Constrained combat capability and cost containment: Operational deployment of the Eurofighter fleet began in 2007 but was limited in configuration and capability by cost-cutting measures and ongoing maintenance challenges (Defense Industry Daily, 2020; Knolle, 2018; Mader, 2022). The government prioritised rationalization and sought alternative fighter replacement options, altering air policing doctrine accordingly (Defense Industry Daily, 2020).
- Programme fragmentation and divergent requirements: Collaborative upgrade efforts for the Typhoon struggled due to disparate operational needs among partner nations

(UK, Germany, Italy, Spain), illustrating challenges in multinational defence procurement harmonization (Heinrich, 2015, p. 353).

4.3.3.6 Analytical assessment

The Austrian Eurofighter case highlights the complex interaction between institutional and behavioural reforms in addressing defence procurement issues. Necessary procedural reforms included stronger parliamentary oversight, improved audit and procurement processes, and compliance with EU anti-corruption standards, alongside practices like minority-led inquiries and international cooperation. Behavioural changes, such as tighter conflict-of-interest rules and greater transparency norms, were reinforced by media and civil society pressure. However, efforts to professionalize procurement and promote ethical leadership were uneven and often hindered by political and bureaucratic challenges.

According to the comparative analytical framework (see table 5), Austria's experience highlights key lessons:

- Personal ambition and rivalry: Formal oversight mechanisms like parliamentary inquiries sought to improve accountability, but meritocratic processes were limited. Influential informal networks of political allies, senior officials, and business intermediaries sustained sycophantic behaviours and hierarchical exclusion, undermining transparency and broad participation. As a result, meritocratic oversight and feedback offered only partial mitigation amid entrenched personal and factional rivalries.
- Cognitive and institutional bias: Institutionalized dissent was limited; groupthink and status quo bias impeded critical challenge functions in procurement decisions, with technical and financial assessments often constructed to justify preferred outcomes and external expert input regularly excluded or overridden.
- Information manipulation: Anonymous feedback channels and ombuds services remained emergent rather than established, and contract terms, including cost data and technical details, frequently lacked transparency or were selectively disclosed, undermining effective parliamentary and public oversight despite procedural reforms.
- Rent-seeking risks: E-procurement systems and stricter role definitions were introduced as part of reform efforts, but adoption was partial and effectiveness was undermined by fragmented responsibilities across government agencies, the armed forces, and contractors. Persistent administrative fragmentation and insufficient

professionalization enabled rent-seeking through opaque offset arrangements and intermediary networks.

- Corruption: Judicial empowerment in Austria supported civil litigation against Airbus and the Eurofighter consortium; however, significant gaps in oversight capacity and extensive administrative discretion meant that criminal investigations into procurement corruption were ultimately dropped due to insufficient evidence, limiting accountability for implicated actors.

Overall, Austria's case reflects both the promise and constraint of integrated reform. While structural enhancements advanced transparency and accountability, persistent rent-seeking, technical knowledge gaps, administrative fragmentation, and elite resistance constrained the impact of these reforms. Durable procurement integrity will require a dual-track strategy: embedding robust legal safeguards alongside sustained behavioural change, leadership accountability, and the normalization of dissent.

4.3.4 Ukraine: Defence procurement reform under wartime pressure

4.3.4.1 Historical and institutional context

The full-scale Russian invasion of Ukraine in February 2022 exposed not only immense operational challenges but also systemic vulnerabilities in Ukraine's defence procurement sector, highlighted by cases of overpricing, the abuse of intermediaries, and delivery of substandard materiel (Cifuentes-Faura, 2024, p. 2; Huss & Musiiaka, 2022 Transparency International Defence & Security & Independent Defence Anti-Corruption Committee [NAKO], 2018, September 24, p. 5). These issues, exacerbated by longstanding patterns of corruption in the post-Soviet state, triggered public and political demands for comprehensive reform to ensure rapid, transparent, and accountable procurement aligned with NATO and EU standards (Bukkvoll & Solovian, 2019; Králiková, 2022, pp. 245–246; OECD, 2025, p. 18). Wartime conditions sharply raised the stakes: corruption risks were no longer a matter of fiscal waste but of frontline effectiveness and national survival (Cifuentes-Faura, 2024, p. 2; Ivanova & Rudolph, 2025; OECD, 2025, p. 18).

4.3.4.2 Salient dysfunction(s)

- Personal ambition & rivalry – Competition for influence among senior defence leaders and procurement agency managers led to fragmented authority and reduced cohesion, with instances where personal or political ambition hindered meritocratic decision-making and allowed factional interests to influence contract allocation

(Huss & Musiiaka, 2022; Ivanova & Rudolph, 2025; Kravtsov et al., 2024, p. 34; Richter, 2023, p. 616).

- Cognitive & institutional bias – Under rapid and high-pressure wartime conditions, optimism bias, groupthink, and reinforcement of status-quo solutions limited rigorous challenge and adaptive learning in procurement choices, while urgency often sidelined external expert input and review (Králiková, 2022, pp. 245–246; Huss & Musiiaka, 2022; Shulhan, 2024, p. 402).
- Information manipulation – Selective disclosure, underdeveloped whistleblower protections, and ambiguity about the boundaries of legitimate secrecy contributed to limited contract traceability, with some reporting withheld and non-lethal procurement more open than lethal, due to martial law and operational security (Cifuentes-Faura, 2024, p. 2; Transparency International Defence & Security & NAKO, 2018, September 24, p. 5).
- Rent-seeking – Abuse of emergency contracting mechanisms facilitated price inflation, collusion, and the proliferation of intermediaries, especially before major digital platform reforms. Ongoing risks include allocation of contracts to politically connected suppliers during urgent procurement (Cifuentes-Faura, 2024, p. 2; Huss & Musiiaka, 2022; OECD, 2025, p. 18).
- Corruption – Longstanding vulnerabilities in oversight, monitoring, and enforcement enabled illicit conduct in procurement. Despite recent progress, anti-corruption agencies have faced persistent challenges in criminal prosecution and risk-based audit coverage, with cases of procurement fraud and institutional resistance continuing to emerge (Cifuentes-Faura, 2024, pp. 2–3; Ivanova & Rudolph, 2025; OECD, 2025, p. 18)

4.3.4.3 Mapping of reforms

Institutional / structural solutions

- Strengthening anti-corruption institutions: The Specialised Anti-Corruption Prosecutor's Office (SAPO), National Anti-Corruption Bureau of Ukraine (NABU), and National Agency for Corruption Prevention (NACP) all received expanded legal mandates, staff increases, and enhanced resources, significantly improving their operational and investigative capacity (OECD, 2025, p. 26).
- Centralisation and creation of new agencies: Ukraine restructured its procurement system by establishing two dedicated central bodies in late 2023: the Defence

Procurement Agency (DPA), responsible for military (lethal) equipment, and the State Operator for Non-Lethal Acquisition (DOT), tasked with non-military (non-lethal) defence supplies. This reform transferred procurement authority from dispersed ministerial departments to these new, specialized agencies to strengthen coordination, efficiency, and control (European Commission, 2024, October 30, pp. 6, 59–60; DOT, DPA & NACP, 2025, July 3).

- Strengthened oversight and legal measures: Recent legislation introduced independent supervisory boards, mandated external audits, and implemented risk-based control mechanisms, notably expanding the audit mandates of both the Accounting Chamber and the State Audit Service (OECD, 2025, pp. 23, 114, 167).
- Digitalisation and open procurement platforms: Non-lethal procurement was largely migrated to the ProZorro open e-procurement platform, allowing instant public scrutiny and flagging of suspicious bids through affiliated watchdog networks (Kravtsov et al., 2024, pp. 34–35; Yukins & Kelman, 2022, pp. 25–26). In 2025, DPA and DOT introduced an integrated digital platform—the DOT-Chain Defence marketplace—to streamline procurement procedures and enhance transparency, particularly in line with NATO anti-corruption standards (MoD of Ukraine, 2025, June 10).

Behavioural / leadership interventions

- Professionalisation and integrity training: Specialised training programmes for procurement officers—developed in collaboration with NATO, EU experts, and domestic civil society—have elevated integrity standards within Ukraine's defence sector (Huss & Musiiaka, 2022; Králiková, 2021, pp. 249–250). Building on these efforts, a comprehensive training initiative for defence procurement was launched in early 2024 to further strengthen professional capacity and ethical practices (European Commission, 2024, October 30, p. 60).
- Civil society engagement and watchdog co-production: Regular engagement with reform-oriented NGOs and procurement monitoring groups, such as NAKO, has facilitated public reporting, strengthened whistleblower protections, and promoted participatory oversight in Ukraine's defence procurement system (Huss & Musiiaka, 2022; NAKO, 2025). The NACP supports these efforts by providing civic education, building the capacity of officials for corruption prevention, and ensuring guidance on integrity and whistleblower protection, including in the private sector. The

National Agency of Ukraine on Civil Service (NAUCS) plays a complementary role, focusing on HR management in the civil service, overseeing recruitment, evaluation, promotion standards, and fostering organisational openness (OECD, 2025, p. 26).

- Transparency norms and public disclosure: Following consultations with civil society, the government adopted a roadmap on 26 June 2024 to restore a pluralistic and transparent media environment after martial law (European Commission, 2024, October 30, p. 39).

4.3.4.4 Enabling / constraining factors

Enabling factors

- Wartime political will and leadership: The existential threat posed by full-scale invasion generated strong presidential and parliamentary support for rapid procurement reform, overcoming much peacetime inertia and bureaucratic resistance. The alignment of executive, legislative, and civil society actors created unique momentum for ambitious change (Huss & Musiiaka, 2022; OECD, 2025, p. 18).
- External conditionality and support: EU and NATO benchmarks offered templates, external pressure, and political incentives for procurement transparency and alignment (European Commission, 2024, October 30, p. 27; Huss & Musiiaka, 2022; Králiková, 2021, pp. 249–250).
- Civil society and media oversight: Active engagement by reform-oriented NGOs, investigative media, and independent watchdogs (e.g., NAKO, StateWatch) sustained public scrutiny, exposed abuses, and pressured authorities to sustain reform momentum, including during periods of wartime secrecy (Huss & Musiiaka, 2022; NAKO, 2025; StateWatch, 2024, August 2).

Mixed factors

- Wartime urgency accelerated procurement reform and fostered greater receptiveness to innovation and oversight. However, ongoing martial law, the need for operational secrecy, and shifting command structures at times reduced routine public and parliamentary scrutiny (Shulhan, 2024, p. 402; European Commission, 2024, October 30, p. 60).

Constraining factors

- Elite resistance and institutional fragmentation: Turf battles and rivalries among the MoD, newly established procurement agencies (DPA, DOT), and oversight boards

led to bypassing, duplication, or dilution of reforms. Political and bureaucratic elites have periodically resisted full implementation of oversight and transparency measures, especially for large contracts (Huss & Musiiaka, 2022; Ivanova & Rudolph, 2025; Kravtsov et al., 2024, p. 34; Richter, 2023, p. 616).

- Capacity and technical gaps: Rapid reform frequently outpaced available skilled procurement personnel and full digital infrastructure roll-out, limiting audit coverage and complete traceability (European Commission, 2024, October 30, pp. 59–60; OECD, 2025, p. 82).
- Legal and regulatory complexity: Rapid legislative changes and overlapping mandates created occasional confusion about roles and responsibilities for both procurement and oversight bodies. Inconsistent or delayed bylaws and standard operating procedures hampered reform rollout and coordination (OECD, 2025, p. 28–29).

4.3.4.5 Observed outcomes

Transparency

- Transparency and digital traceability: The introduction of mandatory disclosure for non-lethal defence contracts via ProZorro institutionalised continuous monitoring and enabled complaint mechanisms, with risks and abuses regularly identified by watchdogs and journalists (Yukins & Kelman, 2022, p. 23). DPA and DOT are required to comply with strengthened transparency standards, including expanded publication of procurement data (European Commission, 2024, October 30, pp. 59–60). Evidence from aggregated reporting confirms that shifting procurement to open digital platforms improved oversight, curtailed hidden dealings, and generated measurable cost savings (Kravtsov et al., 2024, p. 35; Yukins & Kelman, 2022, p. 25). Despite these gains, gaps remain in the legal framework concerning mandatory disclosure and audit coverage, with reforms still in progress to reinforce traceability and public reporting (European Commission, 2024, October 30, p. 60).
- Audit improvements: The Accounting Chamber and the State Audit Service introduced risk indicators designed to prioritise audits and investigations of contracts with heightened corruption risk, further improving targeted oversight (OECD, 2025, p. 43). The State Audit Service continues to oversee the legal compliance of contract awards and their execution; however, the overall coverage of procurement

monitoring and ex post internal audits remains limited, highlighting ongoing capacity constraints (European Commission, 2024, October 30, p. 60).

- Legal foundations: The Law on Access to Public Information (2015) and the Law on Lobbying (2024) established new transparency rights and standards, though the "de-oligarchisation law" drew criticism over implementation gaps and risk of selective enforcement (OECD, 2025, pp. 23, 167–170).

Accountability

- Stronger anti-corruption enforcement: Specialised anti-corruption bodies—such as the NABU, SAPO and NACP—have had their mandates reinforced and staff increased, leading to more effective investigation, prosecution, and adjudication of high-level corruption cases. Even amidst wartime challenges, authorities largely maintained their operational enforcement capacities, as evidenced by ongoing criminal proceedings and dismissals of officials implicated in procurement fraud (Cifuentes-Faura, 2024, pp. 2–3).
- Civil society integrity gains: Sustained media investigations, empowered NGOs, and formal whistleblower systems reduced reliance on intermediaries and informal networks. Regular public reporting and successful exposure of abuses cultivated an institutional climate less tolerant of rent extraction or information manipulation (European Commission, 2024, October 30, pp. 34-35; Huss & Musiiaka, 2022; Králiková, 2021, p. 250; Richter, 2023, p. 619).

Effectiveness

- Efficiency and cost savings: More centralised procurement and competitive tendering achieved notable cost savings (OECD, 2025, p. 18; Yukins & Kelman, 2022, p. 25)—DOT alone saved roughly $300 million in its first year by contracting below projected prices (Ivanova & Rudolph, 2025). The expanded use of ProZorro enabled broad vendor participation and transparent, real-time competition, pressuring prices down and reducing space for inflated contracts or collusive arrangements (Kravtsov et al., 2024, p. 35). Furthermore, the integration of *DOT Chain*, a blockchain-based procurement infrastructure aligned with NATO standards, is expected to further automate compliance monitoring and reduce corruption risks in weapons acquisition (MoD of Ukraine, 2025, June 10).
- Impact on military operational capabilities: Ukraine's procurement reforms have made frontline supply chains more efficient, innovative, and aligned to combat

needs, significantly strengthening military operational capacity while allowing for greater cost efficiency and responsiveness. For instance, the DPA and DOT were able to contract and deliver more than one million FPV (First-Person View) drones to frontline units during the first half of 2025 alone, addressing a critical operational need and allowing combat brigades to more directly shape their own equipment profiles based on tactical requirements. And the DOT-Chain digital system enabled units to order drones tailored to specific missions, making procurement much more responsive and agile (Defence Ukraine, 2025, May 17; Defence Industry Europe, 2025, August 2).

- Disruption and learning: Ukraine's specialised anti-corruption institutions (NABU, SAPO, HACC) have improved coordination through a shared case management system (eCase MS), though it remains underdeveloped (OECD, 2025, p. 155). NABU still lacks key investigative tools (European Commission, 2024, October 30, p. 34). The NACP has developed an IT system to monitor the State Anti-Corruption Programme (SAP), but implementation is delayed due to staffing and budget constraints (European Commission, 2024, October 30, p. 34).
- Resistance and persistent gaps: Despite progress, some elite resistance and "reform imitation" persisted—particularly in highly politicised or sensitive procurements (Huss & Musiiaka, 2022; Ivanova & Rudolph, 2025; Králiková, 2021, pp. 251-252; Richter, 2023, p. 616). While the legal framework for integrity and conflict-of-interest management exists, risk assessments and control mechanisms in contracting authorities remain weak, and a sector-specific anti-corruption strategy is lacking (European Commission, 2024, October 30, p. 60). The full-scale Russian invasion of Ukraine has compounded these challenges by significantly depleting the human, financial, and technical resources of the public administration, thereby complicating reform implementation (OECD, 2025, p. 168).

4.3.4.6 Analytical assessment

The Ukrainian defence procurement reform illustrates a dynamic interaction between urgent wartime imperatives and institutional governance reforms. The combination of executive resolve, institutional restructuring, and international support enabled significant procedural improvements such as the establishment of dedicated procurement agencies (DPA and DOT), mandatory use of digital platforms like ProZorro, and enhanced audit and oversight frameworks aligned with NATO standards.

Behavioural changes were also notable: increased transparency norms and whistleblower protections, as well as civil society vigilance, helped raise accountability. Yet entrenched challenges such as elite resistance, fragmented governance, and limited capacity constrained reform implementation and reduced its immediate effectiveness.

Applying the comparative framework (table 5) highlights several key lessons:

- Personal ambition and rivalry: The establishment of new procurement bodies sought to consolidate authority and improve accountability, but lingering rivalries, turf disputes, and patronage networks among senior officials partially undermined cohesive decision-making and reinforced factionalism.
- Cognitive and institutional bias: Under pressure to meet battlefield needs, optimism bias and groupthink sometimes prevailed, limiting critical assessment and openness to external expertise. Reform efforts to expand training and implement analytical routines seek to address these tendencies but require continuous reinforcement.
- Information manipulation: While mandatory disclosure and electronic procurement enhanced transparency, exceptions linked to national security and martial law constricted full openness. Whistleblower protections and anonymous reporting mechanisms remain in development, leaving vulnerabilities to selective disclosure.
- Rent-seeking: Institutional fragmentation and discretionary emergency procurement allowed rent-seeking behaviours to persist, particularly prior to full adoption of e-procurement tools. Structural reforms including contract standardization and competitive bidding have reduced such risks but have not eliminated them entirely.
- Corruption: Despite expanded mandates and new legal frameworks empowering anti-corruption bodies, enforcement challenges continue amid political interference and resource limitations. The war context both heightens urgency and complicates sustained anti-corruption vigilance.

In sum, Ukraine's experience demonstrates how wartime pressures can catalyse rapid reforms but also pose dilemmas between agility and governance rigor. Sustainable progress will depend on embedding reforms institutionally, harmonizing agency functions, building professional capacity, and balancing transparency with operational secrecy. This case thus underscores the need for an integrated approach combining structural, procedural, and behavioural elements to foster resilient and effective defence procurement systems.

4.3.5 Cross-case comparative analysis

This section synthesizes findings across Belgium, Canada, Austria, and Ukraine, focusing on common patterns and divergences linked to recurrent dysfunctional dynamics in defence procurement and their reform trajectories.

4.3.5.1 Personal ambition and rivalry

All four cases exhibit persistent challenges posed by personal ambition and factional rivalry. Belgium and Ukraine face intense political interference, with clientelism and patronage networks undermining meritocratic decision-making. Canada shows evidence of comparatively stronger professionalization, but political influence remains visible in high-profile cases such as the Joint Strike Fighter procurement. Austria's consensual politics somewhat mitigate visible conflicts but still show hierarchical exclusion and turf battles at the administrative level.

Institutional mechanisms like meritocratic promotions and advisory boards have been variably successful. Behavioural reforms promoting shared leadership and recognition have gained traction mainly in Canada and Ukraine, though elite resistance tempers broad effectiveness.

4.3.5.2 Cognitive and institutional bias

Cognitive biases and groupthink recur across all cases, magnified during crises or entrenched bureaucracies. Austria and Belgium report limited dissenting voices and rigid institutional cultures. Canada's more procedural systems manage bias through expert panels and scenario planning, yet urgency-driven decisions occasionally compromise rigor.

Ukraine's wartime conditions exacerbate optimistic biases and reduce systematic critical review, despite reform attempts introducing analytical tools and diversity-enhancing practices.

4.3.5.3 Information manipulation

Information asymmetries and manipulation are widespread. Belgium and Austria experience opaque reporting and restricted disclosure, often justified by confidentiality or political sensitivity. Canada has advanced transparency mandates but struggles with exceptions under security prerogatives.

Ukraine illustrates acute dilemmas: martial law imposes secrecy on lethal procurement while non-lethal items move onto public platforms, balancing transparency against operational security. Whistleblower protections and anonymous communication channels remain underdeveloped in all cases.

4.3.5.4 Rent-seeking

Rent-seeking through overpricing, collusion, and intermediary networks is a central dysfunction. Belgium and Ukraine's cases highlight the entrenchment of these behaviours, with client bases often linked to political actors. Canada's system benefits from e-procurement platforms but still faces lobbying influence and complex offset deals. Austria's fragmented governance creates loopholes exploitable by vested interests.

Modern procurement platforms, risk-based audits, and contract standardization are gaining ground but require fuller institutional integration and technical support to curb unproductive rent-seeking.

4.3.5.5 Corruption

Corruption remains the most critical challenge. Belgium's infamous scandals suggest deep-rooted systemic abuse often tied to political party financing. Canada's political procurement controversies reveal systemic vulnerabilities despite regulatory layering. Austria's neutral stance and complex oversight reduce but do not eliminate risk, with ineffective prosecutions hampering accountability. Ukraine's intense wartime pressures expose corruption risks mitigated partially by expanded anti-corruption bodies yet complicated by governance fragmentation and operational secrecy.

Sustained enforcement and judicial empowerment prove vital but unevenly applied. The role of civil society and investigative journalism emerges as a common counterweight.

5. Developing a competitive defence framework

The preceding chapters have mapped the core challenges undermining defence planning and governance: unresolvable uncertainty in the strategic environment; institutional and structural dysfunctions; and behavioural distortions such as ambition, bias, and corruption. Through literature review, realist evaluation, and comparative case analysis, the research has identified both recurring barriers and plausible reform pathways. Building on this foundation, the present chapter advances from diagnosis to synthesis.

Its purpose is to develop and operationalise a competitive defence framework—a multidimensional model that integrates adaptive planning, institutional reform, and behavioural integrity. Unlike existing approaches that treat these domains separately, the framework seeks to align and integrate them within a coherent architecture capable of enhancing resilience, transparency, and strategic coherence in volatile environments.

This chapter proceeds in a stepwise manner. It begins by outlining the theoretical and conceptual underpinnings of competitive defence, drawing on systems thinking, strategic management, and civil–military relations. It then introduces the structural domains of the framework, mapping reform pathways against diagnosed dysfunctions and illustrating how adaptive and behavioural mechanisms interact. The framework is further refined into a seven-domain architecture, operationalised through concrete instruments and practices. Finally, the chapter presents an implementation roadmap and monitoring and evaluation (M&E) regime, translating the conceptual model into actionable guidance for policymakers and practitioners.

In doing so, this chapter provides the integrative synthesis necessary to answer the general RQ: How can a competitive defence framework be conceptualised and operationalised to equip defence organisations with the capacity to address key operational challenges—uncertainty, governance dysfunctions, bias, and corruption—, while ensuring resilience and adaptability in the face of future challenges? The competitive defence framework thus represents the central theoretical and practical contribution of the thesis.

5.1 Discussion and answer to research question 1

This subchapter addresses the research question:

“What adaptive strategic frameworks can be developed to enhance decision-making under unresolvable uncertainty and ensure effective risk management in defence planning?”

The analysis reveals that NATO has actively integrated adaptive strategic planning in response to the Ukraine crisis. The application of scenario-based foresight, iterative

intelligence updates, and cross-alliance coordination has reinforced NATO's ability to manage uncertainty and dynamic threats effectively.

5.1.1 Scoping, context setting, and mobilization

This phase directly addresses the "Broader contextual uncertainty" and "Complex interdependencies" from table 1. By defining the foresight purpose, scope, and parameters, the framework encourages a systemic understanding of the external environment and the interconnectedness of various factors influencing defence planning. The added activities (AA), such as establishing working groups and incorporating lessons learned, indicate an emphasis on continuous improvement and collaborative knowledge sharing, crucial for adapting to evolving threats.

5.1.2 Environmental sensing and information gathering

Targeting "Intelligence limitations" and "Rapid technological advancements," this phase emphasizes continuous STEEPVL/PMESII-PT analysis and the integration of AI-assisted horizon scanning tools (AA) to enhance proactive monitoring and early detection of emerging trends. The "Partially Verified" (PV) status of real-time intelligence sharing mechanisms suggests a recognized need for improvement in this area, potentially due to challenges in data interoperability or security concerns.

5.1.3 Analysis

This phase mitigates the impact of "Adaptive behaviour of competitors" and "Fog of war" by applying systems-thinking frameworks and leveraging big data analytics (AA/PV). These methodologies facilitate a deeper understanding of complex relationships and the identification of key drivers of change. The "Not Identified" (NI) status (yet Confirmed in the UK case) of cross-impact analysis suggests that, while the importance of assessing interdependencies is recognized, its implementation may vary across contexts, possibly due to resource constraints or differing analytical capabilities.

5.1.4 Vision building, scenario generation, and testing

Addressing the "Unpredictable nature of conflicts" and "Inherent unpredictability of war," this phase employs collaborative visioning workshops, strategic/operational scenario development, and stress testing. The "Confirmed" (C) status across all activities indicates strong institutional support for these methodologies in enhancing strategic foresight and resilience.

5.1.5 Risk evaluation, validation, and communication

This phase addresses "Resource Mismanagement" and "Broader Contextual Uncertainty." The focus on identifying and assessing preventable and external risks, aligning strategic vision with organisational capabilities, and validating risk assessments through consultations promotes more informed decision-making and resource allocation. The "Partially Verified" (PV) status of assessing political and strategic risks and defining acceptable risk tolerance measures suggests potential challenges in quantifying or communicating these risks effectively.

5.1.6 Strategy development and risk mitigation

Building upon prior phases, this stage develops adaptive strategies to mitigate high-priority risks directly addressing several uncertainties, including "Unpredictable Nature of Conflicts," "Resource Mismanagement," and "Adaptive Behaviour of Competitors." The "Added Activity" (AA) of prioritizing military capability development based on critical shortfalls indicates a practical approach to resource allocation and capability enhancement. The "Partially Verified" (PV) status of developing actionable mitigation plans and ensuring financial sustainability suggests that while these are recognized as important, their implementation may face challenges, potentially due to budgetary constraints or political considerations.

5.1.7 Organisational adaptation

This phase emphasizes the need for defence organisations to become more agile and responsive to change and addresses "Complex Interdependencies," "Adaptive Behaviour of Competitors," and "Rapid Technological Advancements." The "Added Activity" (AA) of tailoring organisational designs to large-scale collaboration and streamlining governance processes reflects a recognition of the importance of breaking down silos and improving coordination. However, the "Partially Verified" (PV) status of fostering decentralized command structures and designing flexible organisational frameworks suggests that resistance to change or bureaucratic inertia may hinder the implementation of these activities.

5.1.8 Implementation and resource management

This phase translates strategies into action while ensuring efficient resource utilization, directly addressing "Resource Mismanagement," "Intelligence Limitations," and "Rapid Technological Advancements." The "Not Identified" (NI) status (but Confirmed in the UK) of enhancing procurement agility suggests that while the need for more responsive

procurement processes is recognized, its implementation may vary across contexts, potentially due to regulatory constraints or legacy systems. The "Added Activity" (AA) of optimizing shared logistics and sustainment capabilities indicates a focus on improving interoperability and cost-effectiveness.

5.1.9 Collaborative governance

Fostering a culture of collaboration, ethical conduct, and responsible innovation, this phase primarily addresses "Intelligence Limitations," "Adaptive Behaviour of Competitors," and "Broader Contextual Uncertainty." The "Added Activity" (AA) of promoting intelligence delivery tailored to the needs of political and military leaders suggests a recognition of the importance of aligning intelligence efforts with decision-making processes. However, the "Partially Verified" (PV) status of integrating ethical governance mechanisms indicates that further work may be needed to ensure the responsible use of emerging technologies such as AI.

5.1.10 Crisis response and black swan preparedness

This phase focuses on preparing for high-impact, low-probability events, directly targeting the "Unpredictable Nature of Conflicts" and the "Inherent Unpredictability of War." The "Partially Verified" (PV) status of establishing rapid-decision task forces suggests that while the need for such task forces is recognized, their implementation may face challenges, potentially due to organisational structures or decision-making processes.

5.1.11 Monitoring, feedback, and continuous learning

This phase addresses all categories, ensuring the organisation remains adaptive in the face of ongoing uncertainty and emphasizes the importance of continuous improvement and adaptation. The "Added Activity" (AA) of fostering innovation through collaborative research initiatives and capturing best practices indicates a commitment to learning from experience and adapting to evolving threats. On the other hand, "Partially Verified" (PV) status of conducting periodic multi-level operational assessments and automating monitoring systems suggests that further work may be needed to ensure the effectiveness of these activities.

5.1.12 Key findings

Table 9 presents a comprehensive framework for adaptive defence planning that addresses the key uncertainties outlined in table 1. The framework's strength lies in its emphasis on continuous monitoring, learning, and adaptation. The validation results (C, PV, NI, AA) provide valuable insights into the framework's applicability and areas for further

development and refinement. By implementing this framework, defence organisations can enhance their ability to anticipate, adapt to, and mitigate the challenges posed by an increasingly complex and uncertain security environment.

5.2 Discussion and answer to research question 2

This subchapter addresses the research question:

"How can defence organisations overcome structural and institutional barriers to enhance resource allocation and ensure strategic coherence in a complex and evolving security environment?"

In responding to this question, the subchapter discusses how the proposed institutional reforms directly respond to the structural and governance-related problems diagnosed earlier. It aims to provide evidence on thematic correspondences between categories of dysfunction and the measures designed to counteract them. The subchapter follows a hybrid format, beginning with table 18 which synthetises institutional measures and then provides a comparative narrative analysis for each problem category.

Table 18 – Structural/governance problem diagnoses and institutional measures

Problem category	Diagnosed dysfunction	Key institutional measures
Interservice competition	Fragmented planning and competition among services reduce joint effectiveness.	- Strengthen integrated command structures and joint operational commands. - Promote joint culture through education, doctrine, and leadership. - Establish interservice coordination bodies and joint staff reforms. - Institutionalise personnel exchanges and joint postings.
Organisational challenges	Bureaucratic rigidity, lack of adaptability, and resistance to reform impede innovation and learning.	- Reform promotion systems to reward joint service and collaboration. - Institutionalise open defence innovation ecosystems. - Apply the KIM model. - Embed scenario planning and lessons learned into strategic cycles. - Build structured partnerships with academia and industry.
Governance challenges	Civil-military misalignment and unclear authority compromise strategic coherence.	- Create a high-level strategic oversight body accountable to civilians. - Codify legal frameworks for ministerial authorization. - Institutionalise civilian-military consultation mechanisms. - Empower military leaders to advocate for resources.
The "Praetorian Problem"	Excessive military influence over policy-making undermines democratic control.	- Establish clear authority divisions between civilians and the military. - Restructure military organisations to support civilian leadership. - Codify civil society participation in governance. - Reinforce democratic norms in education and promotions.
Procurement inefficiencies	Obsolete procurement models hinder innovation and	- Institutionalise agile acquisition and TCO analysis. - Reform acquisition pathways to integrate dual-use technologies.

	strategic responsiveness.	- Promote open systems architectures and modular design. - Establish procurement boards and value-based negotiation frameworks.
Decision-making challenges	Hierarchical rigidity and risk aversion suppress foresight and adaptability.	- Adopt flexible, iterative planning models. - Empower military leaders to raise strategic risks. - Institutionalise scenario planning, simulations, and cross-domain learning.
Cultural and knowledge gaps	Divergent epistemic cultures hinder cooperation between military, civilian, and industrial actors.	- Institutionalise joint education and duty assignments. - Include civil and political leaders in joint exercises. - Promote strategic communication frameworks to improve transparency. - Develop partnerships with civil society and academia.

5.2.1 Interservice competition

Interservice rivalry remains a key source of fragmentation and operational inefficiency. The proposed measures—particularly the reinforcement of integrated command structures and the institutionalization of joint staff mechanisms—help harmonise planning efforts across services. Initiatives such as personnel exchanges and educational reforms foster cross-branch trust and familiarity, directly addressing cultural and procedural barriers.

5.2.2 Organisational challenges

Organisational rigidity stems from entrenched behaviours and inefficient structures. The introduction of open innovation ecosystems, strategic use of scenario planning, and reform of promotion systems collectively promote a culture of learning and collaboration. These measures reduce path dependency and incentivise adaptation, thereby tackling the systemic reluctance to reform.

5.2.3 Governance challenges

The tension between political oversight and military planning autonomy undermines alignment. Creating strategic oversight bodies and codifying consultation mechanisms help bridge this civil-military gap. Legal frameworks that clarify roles and responsibilities enhance transparency, while empowering military voices within a civilian-authorised structure improves coordination and accountability.

5.2.4 The “Praetorian Problem”

Democratic control is essential to prevent disproportionate military influence. Measures proposed here include the reinforcement of civilian authority, restructuring of military organisations to reflect democratic subordination, and incorporation of democratic norms into military education. Together, these steps guard against politicization of the armed forces and protect institutional legitimacy.

5.2.5 Procurement inefficiencies

Procurement inefficiencies often result from legacy practices and misaligned incentives. The adoption of agile acquisition models and TCO analysis provides a framework for more efficient resource allocation. Promoting open architecture and modular design further enhances flexibility, while engaging non-traditional suppliers through digital platforms broadens innovation potential.

5.2.6 Decision-making challenges

Bureaucratic inertia and distorted internal communications are common in defence institutions. Iterative planning, simulations, and cross-domain learning are key measures that enhance responsiveness and reduce strategic blind spots. Empowering leaders to present dissenting views contributes to a healthier deliberative culture.

5.2.7 Cultural and knowledge gaps

Fragmentation in professional cultures between military, civilian, and industrial actors limits cooperation. Joint education programs and cross-sectoral exercises bridge this divide. Strategic communication frameworks and partnerships with academia and civil society also enhance public understanding and stakeholder alignment.

5.2.8 Coherence and the path forward

This comparative analysis demonstrates that each institutional problem is met with a set of targeted, thematically consistent measures. These solutions are not only analytically grounded but also operationally actionable. When embedded into institutional routines, they offer a path toward more coherent, transparent, and adaptive defence governance. By addressing dysfunctions comprehensively—across cultural, organisational, and strategic dimensions—the proposed framework enhances resilience and decision-making under complex and evolving security conditions.

5.3 Discussion and answer to research question 3

This subchapter addresses the research question:

“How do ambition, bias, rent-seeking, and corruption continue to shape procurement outcomes across diverse institutional settings, and what lessons can be drawn for improving transparency, accountability, and operational effectiveness?”

To respond to this question, the subchapter undertakes a cross-case comparison of Belgium, Canada, Austria, and Ukraine demonstrates that ambition, bias, rent-seeking, and corruption remain deeply embedded in procurement systems, despite substantial variation in political systems, alliance commitments, and levels of administrative professionalisation.

This persistence underlines a core finding consistent with the analytical framework (see table 5): dysfunctions are not eliminated by structural reforms alone, nor by behavioural interventions in isolation, but endure where the two dimensions fail to reinforce one another.

5.3.1 Consistency with previous studies

The results are consistent with prior research and the framework's diagnostic insights. Institutional reforms frequently generate only "paper compliance," especially when enforcement is weak or discretion remains high, while behavioural reforms without structural anchoring tend to dissipate when leadership changes or political priorities shift. Evidence from all four cases confirms this dynamic: Belgium and Ukraine illustrate how entrenched patronage networks and political interference undermine meritocratic and transparent procedures, while Canada and Austria show that even professionalised bureaucracies and procedural safeguards cannot by themselves prevent bias, lobbying influence, or inertia.

5.3.2 Implications for theory

The findings support and extend existing theory on dual-track reform by demonstrating that effective procurement governance requires the integration of institutional mechanisms with behavioural change. Structural instruments such as oversight bodies, legal frameworks, and digital platforms must be reinforced by leadership development, professionalisation, and the cultural internalisation of ethical norms. Where reforms were partial or unbalanced, dysfunctions persisted, confirming the analytical framework's prediction that institutional and behavioural dimensions are mutually dependent.

At the same time, the results highlight important boundary conditions. Contextual stressors—such as wartime urgency or coalition bargaining—can magnify dysfunctions or neutralise otherwise promising reforms. This underscores the fragility of outcomes when secrecy, politicisation, or rent-seeking are structurally incentivised.

These insights align with George and Bennett's (2005) view that case studies illuminate mechanisms and tensions rather than definitive causal laws, and with Gerring's (2007) argument that multiple cases enhance the scope of analytical generalisation. However, they also challenge overly institutionalist theories that assume legal or technological fixes are sufficient. The comparative evidence demonstrates that even robust institutional innovations may falter under adverse political or security pressures, while formal regulations are easily circumvented in the absence of cultural reinforcement.

Taken together, the results strengthen theories of organisational learning and adaptive governance by showing that sustainable procurement reform depends on the interdependence of formal structures and informal practices, particularly under conditions of crisis or entrenched political bargaining.

5.3.3 Cross-case dynamics

Ambition and rivalry. All four cases exhibit persistent ambition-driven rivalry, though manifested differently. Belgium and Ukraine display politicised interference and factional patronage, while Canada faces subtler political influence in high-profile acquisitions. Austria's consensus politics mitigate overt rivalry but do not eliminate hierarchical exclusion. These outcomes are consistent with the framework's claim that both structural safeguards (e.g., meritocratic promotion) and behavioural reforms (e.g., shared leadership) are necessary; partial adoption, as seen in Belgium and Ukraine, fails to curb rivalry effectively.

Cognitive and institutional bias. Groupthink, status quo bias, and heuristic overreliance are present across contexts. Austria and Belgium exemplify bureaucratic rigidity and limited dissent, while Canada uses expert panels and scenario testing to reduce, but not eliminate, bias. Ukraine's wartime context amplifies optimistic bias and reduces systematic review, showing how crisis conditions overwhelm analytical safeguards. These results align with the framework's emphasis on diversity and dissent as necessary counterweights, but also demonstrate the limits of structural solutions under acute time pressure.

Information manipulation. Information asymmetries remain widespread. Belgium and Austria display opaque reporting justified by confidentiality, while Canada's transparency mandates are constrained by national security exceptions. Ukraine exemplifies the dual challenge: operational secrecy under martial law coexists with selective transparency for non-lethal items. Across cases, the absence of robust whistleblower protections and weak trust-building measures validates the framework's claim that transparency requires both formal disclosure mechanisms and leadership behaviour that fosters candour.

Rent-seeking. Rent-seeking is entrenched in all cases but varies in intensity. Belgium and Ukraine highlight systemic collusion and inflated demand linked to political actors, while Austria's fragmented governance creates exploitable loopholes. Canada benefits from digital procurement tools yet continues to face lobbying influence and complex offset arrangements. The evidence confirms that digitalisation and audit mechanisms are necessary

but insufficient unless accompanied by professionalisation, integrity training, and strong incentives for ethical conduct.

Corruption. Corruption emerges as the most enduring dysfunction. Belgium's scandals reveal systemic abuse tied to party financing, while Canada's politicised procurement controversies expose vulnerabilities despite regulatory layering. Austria's neutral stance reduces risk but weak prosecutions hinder accountability. Ukraine, under wartime pressures, combines heightened corruption risks with significant anti-corruption reforms, demonstrating both the promise and the fragility of externally driven change. These outcomes reaffirm the framework's emphasis on integrated oversight and judicial empowerment, but also reveal the decisive role of external pressure (e.g., EU conditionality, civil society activism) in sustaining momentum.

5.3.4 Answer to the research question 3

The findings provide a clear answer to the RQ3. Ambition, bias, rent-seeking, and corruption persistently shape procurement outcomes because they exploit the gap between formal structures and informal practices. Institutional reforms—such as legal frameworks, oversight mechanisms, and digital platforms—can establish conditions for accountability, but they remain superficial without parallel behavioural change that embeds ethical norms and leadership responsibility. Conversely, cultural and leadership reforms are unsustainable without institutional reinforcement.

The cross-case evidence thus demonstrates that reforms relying on only one track produce temporary or compromised results. Durable improvements in transparency, accountability, and operational effectiveness arise only when institutional solutions (legal clarity, empowered oversight, digital traceability) and behavioural interventions (professionalisation, training, ethical leadership) are pursued together as an integrated dual-track strategy.

In sum, the lesson is clear: sustainable procurement reform requires the alignment of structures and behaviours, ensuring that institutional safeguards and cultural norms reinforce one another across different contexts, crises, and political cycles.

5.4 Thesis discussion and answer to general research question

5.4.1 Definition — Competitive defence

Competitive defence is an institutional posture and operational system that (1) integrates political, informational, economic and military instruments to preserve relative strategic advantage in contested environments; (2) continuously senses, anticipates and

adapts to threats and technological change through modular capability planning, iterative learning, and experimentation; and (3) embeds transparent accountability, professional norms, and anti-capture safeguards (e.g., open contracting, ex-post audits, conflict-of-interest registers, and whistleblower protections) to prevent undue influence from corruption, rent-seeking, or factional ambition.

This concept is distinguished from related notions such as deterrence, resilience, and strategic competition. Whereas deterrence emphasizes dissuasion through capability and credibility, and resilience stresses recovery after disruption, competitive defence highlights the continuous adaptation of defence institutions in a contested environment where strategic advantage is never permanent.

The definition adopted here is not solely theoretical; it is grounded in empirical analysis of NATO's adaptation to the Ukraine crisis, case studies of procurement reform, and cross-case comparative dynamics. These empirical insights shaped the operational contours of competitive defence, ensuring that the concept is analytically robust and policy-relevant.

In scope, competitive defence applies primarily to state-level defence organisations in democratic contexts. While many insights may be transferable to non-democratic or hybrid regimes, the normative assumptions embedded in the framework—such as civilian control, transparency, and accountability—limit its universal applicability.

By integrating behavioural, institutional, and strategic dimensions into a single operational framework, this definition advances the literature beyond fragmented treatments of defence innovation, institutional reform, or civil–military relations. It highlights that competitive defence is not simply a posture against external threats but also an internal process of overcoming organisational dysfunction, aligning resources with strategy, and fostering cultural transformation.

In sum, competitive defence is both a strategic orientation and an institutional practice. It is strategic, in that it seeks to sustain advantage under conditions of unresolvable uncertainty; it is institutional, in that it requires adaptive governance, cultural change, and coordinated implementation.

5.4.2 Methodological alignment and analytic strategy (abductive, realist-informed synthesis)

The analytic strategy employed in this discussion builds directly on the methodological approach established in chapter 3. The aim here is to demonstrate how the abductive and

realist-informed synthesis is applied to answer the General RQ and to consolidate the thesis's findings into a coherent framework.

This strategy is abductive in nature, moving iteratively between theory and empirical illustration. Conceptual constructs such as adaptability, resilience, innovation, and governance are reconsidered considering empirical cases and policy examples, while the evidence itself is interpreted through theoretical lenses. This back-and-forth reasoning enables the identification of mechanisms—such as path dependency, bias, corruption, or institutional inertia—that account for variation in defence organisations' competitiveness across contexts.

The synthesis is also realist-informed, focusing on the interplay of context, mechanism, and outcome. By tracing how structural conditions, institutional arrangements, and leadership practices interact to produce adaptive success or failure, the analysis identifies causal pathways that underpin competitive advantage in defence. In doing so, it moves beyond descriptive comparison toward explanatory depth and prescriptive utility.

The alignment of this strategy with the earlier methodology is reflected in the integration of the three RQs. Benchmark validation (RQ1), applied solutions mapping (RQ2), and structured cross-case comparison (RQ3) are not treated as isolated tasks, but as interdependent analytic streams feeding into the final synthesis. This interdependence reflects methodological reflexivity: each stream refines the others through iterative feedback, ensuring that the competitive defence framework is not an abstract construct but a theory-informed, evidence-grounded tool. Together, they provide the conceptual and empirical basis for the development of the competitive defence framework, which represents the thesis's primary contribution.

5.4.3 Summary judgement: conceptual validity and implementation gap

The overall assessment of the seven-phase Integrated Framework (table 8) confirms its conceptual validity. The seven domains—strategic comprehension; competitive positioning; organisational adaptation; capability & procurement agility; resilience & continuity; leadership & human capital; performance & learning—collectively represent the minimum architecture required for a competitive defence posture. This validity rests on convergent triangulation: RQ1 confirmed alignment with recognised benchmarks of adaptive planning; RQ2 demonstrated that proposed solutions map directly onto recurrent

institutional bottlenecks; and RQ3 showed that failure modes across diverse cases can be systematically interpreted through these seven domains.

However, a systematic implementation gap is apparent. The evidence indicates a persistent asymmetry: upstream functions (foresight, doctrinal innovation, alliance alignment) are comparatively well-institutionalised, whereas downstream executional functions (procurement agility, modular acquisition processes, institutionalised lessons application) remain fragile, fragmented, or inconsistently adopted. Across cases, this imbalance emerges as the principal barrier to converting conceptual posture into operational advantage.

The impediments underlying this gap are not merely technical but structural and behavioural. Entrenched incentive systems privilege short-term political or service interests over long-term coherence; information asymmetries between political authorities, military services, and industrial actors undermine transparency and accountability; and political–industrial path dependencies constrain reform trajectories by locking organisations into legacy practices and sunk-cost logics. Collectively, these mechanisms attenuate the enabling conditions required for table 8 mechanisms to generate their intended outcomes.

5.4.4 Interpretation: insights from the results

The synthesis of findings across the three research objectives indicates that defence competitiveness cannot be reduced to financial capacity or technological sophistication in isolation. Rather, it emerges from the interaction of three mutually reinforcing dimensions: strategic adaptability under conditions of uncertainty, institutional coherence through structural reform, and behavioural integrity that safeguards legitimacy and accountability.

The first insight is that uncertainty is not an episodic disruption but a structural feature of the contemporary security environment. Efforts to eliminate uncertainty through predictive modelling or long-range forecasting are inherently limited, as shown in multiple case failures. What matters instead is the institutionalisation of adaptive planning practices—scenario libraries, red-teaming, horizon scanning, and iterative review cycles—that embed resilience and responsiveness into organisational processes.

The second insight is that institutional barriers—such as interservice rivalry, fragmented procurement, and weak oversight—constitute systemic and recurrent dysfunctions rather than transient anomalies. Reforms confined to the formal-structural layer (rules, budgets, procedures) frequently result in “paper compliance.” By contrast, dual-track strategies that integrate structural reform with behavioural transformation—altering

cultures, norms, and incentive structures—demonstrated greater promise across cases for generating sustainable outcomes.

The third insight is that behavioural dysfunctions—including ambition, bias, rent-seeking, and corruption—distort decision-making and erode institutional legitimacy. Addressing these requires a combined strategy of hard institutional safeguards (legal frameworks, digital traceability, independent audits) and soft behavioural levers (leadership development, professional ethics, cultural incentives). The comparative analysis consistently showed that the most durable improvements occurred when both sets of mechanisms were implemented in tandem.

Taken together, these findings suggest that defence competitiveness is a multidimensional construct that depends not on absolute resource levels but on the synergy of adaptive strategy, institutional coherence, and governance integrity. This interpretation underscores that competitive advantage is sustained not by isolated reforms but by the interdependence of these three dimensions, a conclusion that sets the stage for robustness testing and the consideration of alternative explanations in the following section.

5.4.5 Alternative explanations and robustness checks of the findings

No analytical framework is without limitations, and alternative interpretations of the findings must be explicitly acknowledged. One possible explanation is that the observed reforms represent elite-driven "window dressing," aimed primarily at securing political or alliance legitimacy rather than generating genuine institutional change. This interpretation would suggest that reforms are more symbolic than substantive, designed to satisfy external audiences without altering entrenched practices. Another alternative is that NATO's adaptation since 2014 may be attributed less to institutional foresight or resilience than to geopolitical necessity, with Russian aggression creating pressures so overwhelming that adaptation became unavoidable regardless of institutional preparedness. In this view, change reflects external compulsion rather than endogenous reform capacity. Similarly, in Ukraine, improvements in transparency and oversight could be interpreted as wartime anomalies—temporary by-products of donor scrutiny and survival imperatives, unlikely to persist once external pressure subsides.

To mitigate these risks, this research applied several robustness checks. First, triangulation across heterogeneous sources—including government documents, independent audits, civil society reports, and watchdog assessments—reduced the risk of documentation bias and elite self-presentation. Second, comparative diversity in case selection (Belgium,

Canada, Austria, and Ukraine) ensured that findings were not artefacts of a single institutional or cultural context but instead reflected cross-national regularities and divergences. Third, realist-informed synthesis, guided by the CMO heuristic, allowed systematic attention to how reforms operated differently across settings depending on institutional culture, political oversight, and operational conditions. Finally, the consistent distinction between structural and behavioural measures, applied in synthesis tables and case mappings, provided an additional layer of robustness by exposing instances where formal reforms risked "paper compliance" without corresponding behavioural change.

These robustness checks do not eliminate all limitations, but they increase confidence that the findings presented here are not the product of selective interpretation. Instead, they emerge from a tested synthesis that accommodates variation, acknowledges rival explanations, and remains sensitive to contextual diversity. This prepares the ground for assessing the operational robustness of the proposed framework in the following section.

5.4.6 Operational framework for competitive defence

Building on the preceding synthesis of findings, this section consolidates results into a single operational framework that translates the concept of competitive defence into an actionable model. The framework integrates theoretical insights and empirical evidence into a multidimensional design intended to guide both scholarly debate and practical reform. Unlike conventional models that privilege financial inputs or technological metrics, the framework is explicitly multidimensional, linking strategic adaptability, institutional reform, and behavioural integrity as interdependent sources of competitiveness.

The framework specifies the seven phases of competitive defence, the structural and behavioural mechanisms required at each stage, and the corresponding indicators (scored on a 0–3 ordinal scale), governance owners, external levers, crisis-mode provisos, and contextual moderators. This design ensures that each phase is not only conceptually defined but also operationally measurable, with built-in safeguards against "paper compliance." Presented in table 19, the framework provides a roadmap that is at once diagnostic (identifying institutional gaps), prescriptive (suggesting reform pathways), and evaluative (specifying performance indicators). Full measurement definitions and the scoring codebook are provided in Appendix A.

Table 19 – Operational framework for competitive defence

Phase	Strategic focus	Core mechanisms (structural + behavioural)	Primary indicators (examples, scored 0–3)	Governance owners	External levers	Crisis-mode proviso	Contextual moderators
1. Strategic comprehension	Anticipate change and align goals	Structural: Scenario libraries; red-teaming units; horizon scanning cells. Behavioural: Critical thinking training; cognitive diversity in planning teams; openness to dissent.	1. % of strategic reviews conducted quarterly. 2. % of scenarios stress-tested annually. 3. # of cross-agency analytic products published.	Defence Ministry (planning dept.); National Security Council; Intelligence agencies.	NATO foresight platforms; think tanks; academic partners; watchdog research bodies.	Delegated planning authority; retro-review within 90 days; sunset clauses for emergency strategies.	Threat volatility; alliance dynamics; foresight expertise.
2. Competitive positioning	Sustain advantage in strategic competition	Structural: Integrated national power strategies (DIME tools); coalition readiness frameworks. Behavioural: Adaptive leadership for repositioning; coalition-building mindset across services.	1. Existence of a published national competitive strategy. 2. % of budget aligned with strategic roadmap. 3. % of readiness metrics published and externally verified.	National Security Council; MoD strategy office; Parliament defence committee.	Donor conditionality; International Monetary Fund/EU reporting; defence pacts.	Temporary budget flexibility; retro-audit of crisis spending within 6 months; readiness reporting restored post-crisis.	Fiscal transparency; political stability; donor oversight.
3. Organisational adaptation	Align institutions with strategic imperatives	Structural: Joint doctrine; adaptive procurement rules; streamlined command structures. Behavioural: Change-oriented leadership; institutionalisation of jointness; incentives for interoperability.	1. % of doctrine harmonised across services. 2. # of adaptive procurement pilots launched. 3. % of commands with interoperable processes.	MoD (doctrine & procurement depts.); Chiefs of Defence; Defence academies.	Peer military exchanges; allied joint commands.	Emergency procurement authorised; retro-audit within 12 months; sunset clauses for temporary doctrinal changes.	Civil–military trust; bureaucratic inertia; leadership turnover.
4. Capability, innovation & procurement agility	Build capabilities through innovation & procurement agility	Structural: Modular procurement architectures; dedicated R&D funds; innovation incubators. Behavioural: Innovation culture; openness to experimentation; meritocratic promotion of innovators.	1. % of budget allocated to R&D. 2. # of modular acquisition projects initiated. 3. # of innovation partnerships with private sector/academia.	Defence procurement agency; Innovation units; Parliamentary budget office.	EU Defence Fund; NATO DIANA; private-sector competition	Fast-track R&D authorised; retro-review of contracts/ intellectual property within 6 months; sunset clauses on temporary priorities after 1 year.	Defence–industry relations; fiscal flexibility; private-sector capacity.

5. Resilience & continuity	Ensure endurance under disruption	Structural: Civil defence infrastructure; NATO resilience baselines; logistics and cyber redundancy. Behavioural: Public trust in institutions; participatory resilience drills, transparent leadership communication.	1. # of resilience exercises conducted annually. 2. Composite civil preparedness score (health, infrastructure, cyber). 3. # of crisis-response audits published.	MoDs, Ministries of Interior and Health; Parliament resilience committee; Local authorities.	NATO baseline assessments; civil society watchdogs; infrastructure regulators.	Delegation of resilience powers authorised; retro-review of delegated measures within 6 months; automatic expiry of extraordinary powers.	Public trust; alliance credibility; media freedom.
6. Leadership & human capital	Cultivate adaptive leadership and institutional learning	Structural: PME systems; talent pipelines; succession planning frameworks. Behavioural: Adaptive leadership styles; mentoring cultures; reinforcement of ethical and collaborative norms.	1. % of officers completing JPME/joint training. 2. Leadership diversity index. 3. % of units with audited succession plans. 4. % of leaders receiving ethics/ mentorship training.	Defence academies; MoD HR dept.; Parliamentary HR/ education committee.	CSOs; professional associations.	Temporary appointments authorised; retro-review of appointments within 3 months; sunset clauses for emergency HR derogations.	Professional culture; recruitment base; political interference.
7. Performance & strategic learning	Evaluate outcomes and sustain legitimacy	Structural: Independent audit agencies; performance dashboards; parliamentary oversight. Behavioural: Learning-oriented leadership; constructive feedback culture; tolerance for failure in experimentation.	1. # of independent audits completed annually. 2. % of reforms adjusted following M&E feedback loops. 3. Public trust index (survey-based).	Audit Court; Parliament defence committee; Civil society watchdogs.	Media scrutiny; CSOs; international monitoring (EU, OECD, donors).	Temporary suspension of audits allowed; retro-audit within 12 months; performance reporting resumed within 6 months.	Civil society activism; media scrutiny; international monitoring.

Table 19 operationalises competitive defence by linking strategic focus to mechanisms, indicators, governance ownership, external levers, and crisis provisions, all within their contextual moderators. Several features reinforce the framework's distinctiveness:

- First, it integrates structural and behavioural mechanisms, recognising that formal rules and institutions must be matched by cultural and normative change to avoid superficial reforms.
- Second, it embeds explicit performance indicators, enabling comparative measurement across cases and reducing reliance on subjective judgements.
- Third, it assigns governance ownership and identifies external levers, ensuring accountability while acknowledging the role of allies, donors, and civil society in shaping outcomes.
- Fourth, it incorporates crisis-mode provisos, ensuring that emergency adaptations remain subject to retrospective oversight and sunset clauses. This preserves democratic legitimacy under conditions of exceptional stress.

Taken together, these features make the framework both analytically rigorous and policy relevant. It does not claim universal applicability, but it offers a replicable tool for analysing, designing, and evaluating defence reform under conditions of competitive pressure. For scholars, the framework provides a conceptual architecture to advance theory-building on defence adaptation. For practitioners, it serves as a diagnostic and planning aid, highlighting where implementation gaps are likely to arise and what mechanisms may address them.

5.4.7 Alternative explanations and robustness checks of the framework

No framework is immune to competing interpretations, and testing the robustness of the operational design for competitive defence (table 19) requires explicit consideration of alternative explanations. Three dimensions deserve particular attention.

First, structural determinism. A common counterargument is that institutional performance in defence is shaped primarily by structural conditions—economic resources, alliance obligations, or geopolitical exposure—rather than by the type of institutional or behavioural reforms identified in this thesis. As shown in table 19, contextual moderators (e.g., fiscal transparency, alliance dynamics, political stability) explicitly recognise that

reforms operate within such constraints. The robustness of the framework therefore lies not in denying structural influence, but in demonstrating—through comparative evidence—that adaptability, jointness, and accountability improve outcomes even under adverse structural conditions.

Second, path dependency and cultural inertia. It might be argued that entrenched institutional cultures render reforms superficial or unsustainable, regardless of the formal mechanisms introduced. This critique is mitigated in table 19 through the pairing of structural and behavioural mechanisms across all phases, ensuring that reforms are not conceived as purely technical fixes but as transformations requiring leadership incentives, cultural change, and institutional learning. This dual-track approach strengthens robustness by addressing both formal rules and informal practices.

Third, crisis exceptionalism. Another alternative explanation is that many of the observed reforms—especially in the case of Ukraine—reflect wartime urgency and are therefore unlikely to persist in peacetime. Table 19 addresses this risk by including crisis-mode provisos, which establish temporary derogations (e.g., emergency procurement, delegated resilience measures) coupled with retroactive reviews and sunset clauses. These safeguards aim to balance responsiveness in crisis with accountability in recovery, reinforcing the plausibility of reforms beyond exceptional circumstances.

Taken together, these robustness checks provide confidence that the competitive defence framework is not an artefact of temporary conditions or Western bias, but a multidimensional design attentive to structural limits, cultural dynamics, and crisis pressures. The inclusion of *governance owners* and *external levers* further enhances robustness by anchoring reforms in networks of accountability and external verification, reducing the risk of insularity, elite capture, or reform reversal.

Having established the robustness of the framework against alternative explanations, it is now necessary to demonstrate its practical analytical utility. While table 19 provides a comprehensive architecture, its credibility depends on whether the proposed phases, mechanisms, and indicators can be meaningfully applied to diagnose real-world problems. To illustrate this, the following section presents three compact CMO matrices. These exemplars show how the framework operates in practice by mapping contextual constraints to mechanisms, linking them with measurable outcomes, and specifying verification methods.

5.4.8 Operationalisation of the competitive defence framework through Context–Mechanism–Outcome matrices

The following three CMO matrices operationalise the competitive defence framework by applying it to critical problem-sets identified across the case studies. Each matrix links contextual conditions to structural and behavioural mechanisms, specifies measurable outcomes and indicators, notes verification methods, and outlines the causal pathway with conditionalities. They also cross-reference the relevant phases and numbered indicators in table 19. Indicator definitions, coding rules, and detailed scoring criteria (0–3 scale) are provided in Appendix A. These examples are not exhaustive; they illustrate how the framework can be employed as both a diagnostic tool and a prescriptive guide for reform.

Matrix 1 — Uncertainty & technology adoption (Maps to table 19: Phases 1 & 4)

Context	**Mechanism(s)**	**Outcomes — Indicators** (see Appendix A for scoring)	**Verification methods**	**Causal pathway & conditions**	**Relevant table 19 phases / indicators**
Rapid technology diffusion; legacy acquisition timetables; high threat uncertainty; weak industry-academia links.	Institutionalise scenario libraries and red-teaming; adopt modular/ open system architecture and prototyping pathways; establish innovation sandboxes with academia/industry.	% of scenarios stress-tested annually (1.2). # of modular acquisition projects initiated (4.2). # of innovation partnerships with private sector/academia (4.3).	Strategy office outputs; procurement specifications; project timelines; pilot evaluation reports.	Foresight reduces surprise; modularity reduces lock-in; pilots reduce technical and institutional risk. Failure risks: rigid procurement law, political resistance.	Phase 1: Indicator 1.2. Phase 4: Indicator 4.2–4.3.

Matrix 2 — Interservice competition & cultural fragmentation (Maps to Table 19: Phases 3 & 6)

Context	**Mechanism(s)**	**Outcomes — Indicators** (see Appendix A for scoring)	**Verification methods**	**Causal pathway & conditions**	**Relevant Table 19 phases / indicators**
Service parochialism; promotion incentives favouring branch loyalty; absence of cross-service curricula.	Mandate JPME with joint modules; introduce rotational joint postings and exchange programs; weight promotion criteria toward joint outcomes; establish reward structures for collaborative performance.	% of doctrine harmonised across services (3.1). % of officers completing JPME/joint training (6.1). Leadership diversity index (6.2). % of units with audited succession plans (6.3).	Personnel records; PME registries; exercise After-Action Reports (AARs); promotion board minutes; 360° assessments.	Cultural change requires experiential exposure (rotations/exercises) and incentive alignment (promotion/reward rules). Structural reforms alone are insuficcient.	Phase 3: Indicator 3.1. Phase 6: Indicators 6.1–6.3.

Matrix 3 — Procurement inefficiencies & corruption (Maps to table 19: Phases 4 & 7)

Context (C)	**Mechanism(s)**	**Outcomes — Indicators (O)** (see Appendix A for scoring)	**Verification methods**	**Causal pathway & conditions**	**Relevant Table 19 phases / indicators**
Political influence over contracts; fragmented procurement authorities; weak judicial follow-up; opaque sourcing & offset deals.	E-procurement platform with immutable logs + open contracting summaries; ex-post audits mandated to independent audit office; certification for procurement cadres; conflict-of-interest registers; CSO verification protocols and publication requirements.	% of budget allocated to R&D (4.1). Audit-trail completeness index (proxy for 4.2). # of contracts with public summaries (4.3). # of independent audits completed annually (7.1). % of reforms adjusted following M&E feedback loops (7.2).	Document analysis; independent audit reports; CSO assessments; FOI returns; procurement system logs.	Transparency mechanisms (e-procurement, audits) + enforcement capacity → corruption indicators decline, efficiency improves. Weak enforcement or blocked audits → minimal impact.	Phase 4: Indicators 4.1–4.3. Phase 7: Indicator 7.1–7.2.

Taken together, these matrices show how the framework in table 19 can be operationalised to address systemic challenges. They illustrate how specific contexts interact with mechanisms to generate observable outcomes, thereby demonstrating both the explanatory and prescriptive utility of the competitive defence framework. By grounding mechanisms in measurable indicators and verifiable methods, the framework strengthens its evaluative credibility and offers a replicable approach for both comparative research and policy reform.

In addition, these matrices provide a direct bridge to the next section (5.4.9), which concerns improvements required for operationalisation. While 5.4.8 demonstrates how the framework functions when applied to critical problem-sets, 5.4.9 expands the perspective to assess what institutional, cultural, and political adjustments are necessary to embed such applications sustainably. In this way, the CMO examples serve as a practical test case that validates the framework while exposing the operational gaps that the following section will address.

5.4.9 Improvements required for operationalization

To convert the conceptual framework into an implementable instrument, the following enhancements are required and are embedded within table 19 and Appendix A:

(i) Primary indicators (0–3) for each phase with concrete measurement guidance;

(ii) a clear Accountability Owner / Auditor mapping;

(iii) explicit Crisis-mode provisions for each phase (temporary delegations, authorisations, sunset clauses, mandatory retro-audit deadlines);

(iv) External levers mapping where alliances, donors or CSOs can be invoked;

(v) an embedded, concise codebook with scoring guidance (Appendix A), which includes data-quality tags (Public / Classified / CSO-verified);

(vi) procedures for iterative piloting and scaling across domains.

Together, these features enable routine monitoring, cross-case comparison, and conditionality by donors or allies without sacrificing conceptual coherence.

- Primary indicators (0–3) column. For each phase include 3–5 primary indicators and a short descriptor, with scoring guidance using a simple 0–3 rubric (0 = no observable implementation; 1 = pilot/ad-hoc; 2 = established but partial; 3 = institutionalised and regularly audited).

  Example indicators (already reflected in table 19): % of scenarios stress-tested annually, # of modular acquisition projects, % of officers completing JPME, # of independent audits completed annually.

  Rationale: measurable indicators render the framework operational, permit longitudinal tracking, and enable cross-case comparison using a common scoring scale.

- Governance owners column. Specify, for each phase, the implementing authority (accountability owner) and the independent verification body (auditor). Where appropriate, distinguish between internal reviewers (e.g., a ministry inspectorate) and external auditors (e.g., parliamentary audit office, independent commission or accredited CSO verifier).

  Rationale: many reforms fail through “paper compliance”; specifying both implementer and independent auditor reduces role ambiguity and strengthens enforcement pathways.

- External levers column. Identify, for each phase and indicator, relevant external behavioural levers (e.g., alliance interoperability requirements, donor conditionality, industry standards, investigative media or civil-society monitoring) and the mechanism by which they might be invoked.

Rationale: external actors often serve as the decisive catalyst for reform where domestic incentives are weak; explicitly mapping these levers makes conditionality and partnership strategies operational.

- Crisis-mode column. For every phase, include an explicit "Crisis-mode" field that specifies (a) which temporary deviations from normal procedure are permitted, (b) required authorisations for emergency measures, (c) a legally or administratively binding sunset clause, and (d) a deadline for mandatory retroactive audit and public/oversight reporting.

  Rationale: crises (e.g. wartime procurement) change incentive structures and can quickly erode long-term accountability; codifying permissible emergency departures and obliging retroactive scrutiny preserves agility without sacrificing systemic integrity.

- Embedded codebook and scoring guidance. Provide a compact codebook (Appendix A) that defines each indicator, specifies expected data sources, explains the 0–3 scoring rubric, and gives examples of acceptable evidence. The codebook should also describe common edge cases (e.g., aggregated reporting, redacted documents) and how to code them. Data-quality tags (Public, Classified, CSO-verified) are included in Appendix A to increase transparency of evidence provenance and to guide verification strategy.

  Rationale: a compact codebook ensures replicability, reduces coder drift, and enables other researchers or oversight bodies to apply the instrument consistently.

Collectively, these enhancements transform the conceptual framework first presented in table 8 into its fully operationalised form in table 19. The result is a practicable tool for both scholarly analysis and policy implementation: it enables routine monitoring, permits rigorous cross-case comparison, clarifies who must act and who must verify, and embeds safeguards for exigent circumstances. For operational deployment, it is further recommended to pilot the revised framework in one or two domains (for example, non-lethal procurement and a PME reform stream), applying the 0–3 scoring system and the data-quality tags described in Appendix A to refine indicators and verification procedures before scaling across ministries or alliance partners.

5.4.10 Implementation roadmap and monitoring & evaluation

Building on the operational framework in table 19 and the scoring guidance in Appendix A, this section outlines a phased roadmap for implementation and a M&E regime to ensure sustained reform. The objective is to demonstrate how the framework can be deployed in practice, while retaining adaptability to contextual variation.

Phase 1 – Baseline assessment. Each ministry or alliance partner should begin by scoring all indicators (0–3) for the current year ("Year 0 baseline"), tagging evidence for data-quality (Public, Classified, CSO-verified), and compiling a contextual moderators profile (e.g., fiscal transparency, alliance credibility, political interference risks).

Phase 2 – Pilot reform domains. Controlled pilots should be launched in bounded areas where reform is both politically feasible and strategically relevant. Recommended starting points are Phase 4: Capability, innovation & procurement agility (anti-capture procurement packages) and Phase 6: Leadership & human capital (joint PME and mentorship programmes) of the operational framework. Pilots should include quarterly scoring, triangulation with independent audits, and external CSO verification.

Phase 3 – Institutionalisation and scaling up. Successful pilots should be scaled across ministries and commands. Mechanisms (e.g., procurement transparency protocols, crisis-mode sunset clauses, PME requirements, succession planning) should be embedded in formal regulations, PME curricula, and statutory audit obligations. Institutionalisation requires pairing structural measures with behavioural levers, ensuring durability beyond leadership turnover or crisis pressure.

Phase 4 – Continuous monitoring and recalibration. Annual 0–3 scoring should be applied across all phases of the framework. Independent audits should be mandated at least biennially, while CSO verification and donor reviews provide annual external pressure. Every five years, a comprehensive external review should be commissioned, using process tracing, stakeholder interviews, and comparative benchmarking to test causal pathways and recalibrate indicators.

Phase 5 – Integration into alliance and donor mechanisms. For NATO and EU contexts, the framework can be integrated into resilience baselines, capability development plans, and donor conditionality reviews. This external anchoring ensures reform credibility even in states where domestic oversight is weak.

Together, this roadmap establishes a clear sequencing of activities, embeds accountability at each stage, and provides a replicable model for both national defence institutions and allied governance structures.

5.4.11 Limitations and avenues for further research

Recognising that any operational framework entails inherent limitations, it is essential to define its scope of applicability and outline potential pathways for refinement. The framework presented in table 19 represents a structured synthesis of conceptual insights and empirical findings, but its robustness depends on further empirical validation, contextual adaptation, and methodological refinement.

First, political will and leadership continuity. Even well-designed frameworks are vulnerable to elite resistance, shifting political incentives, or leadership turnover. While table 19 embeds behavioural levers to mitigate such risks—such as mentorship, ethics training, and coalition incentives—sustained political commitment remains an external condition beyond the reach of institutional design. This is particularly salient in contexts marked by weak party systems, high factionalism, or entrenched patronage networks.

Second, data quality and visibility. Despite the scoring rubric and data-quality tags in Appendix A, many indicators depend on classified sources, irregular reporting, or politically curated data. This creates risks of visibility bias, especially in comparative coding. Independent audits and civil-society verification can partially address this, but variation in transparency across cases will inevitably limit the comparability of results.

Third, wartime and crisis exceptionalism. Some of the empirical insights informing the framework—particularly from Ukraine—emerged under conditions of acute external threat. Such contexts accelerate reform by necessity, but improvements may not persist in peacetime. Table 19 incorporates crisis-mode provisos and sunset clauses to address this risk, yet whether these safeguards are consistently respected requires further empirical scrutiny.

Fourth, transferability across contexts. The comparative cases studied under RQ3 (Belgium, Canada, Austria, Ukraine) provided critical insights into mechanisms of reform and failure. However, these cases were not evaluated using the final operational framework in table 19, which was developed only at the synthesis stage. Future research should therefore apply table 19 directly across a wider range of geopolitical contexts, especially outside the Euro-Atlantic sphere, to test its generalisability and its adaptability to non-NATO institutional logics.

Fifth, methodological refinement. The 0–3 scoring rubric provides clarity and consistency, but it inevitably simplifies complex institutional dynamics. Some mechanisms may only be meaningfully captured through qualitative methods such as process tracing, Subject Matter Expert interviews, or ethnographic observation. Future work should therefore complement scoring with in-depth qualitative and mixed-method approaches to assess causal pathways and contextual contingencies.

Taken together, these limitations do not undermine the framework's value, but they do define its scope. The operational framework should be understood as a structured and adaptive instrument—tested for internal coherence and grounded in comparative evidence—but one that requires further empirical validation, contextualisation, and methodological enrichment. Future research should prioritise three directions: (i) longitudinal testing of indicators across multiple states; (ii) controlled pilot applications in selected reform domains, paired with independent verification; and (iii) comparative extension to non-Euro-Atlantic contexts to assess external validity. By recognising these boundaries, the framework remains open to iterative improvement and positions itself as a platform for cumulative scholarly and policy engagement rather than as a definitive endpoint.

5.4.12 Answer to the general research question

The General RQ asked: "How can a competitive defence framework be conceptualised and operationalised to equip defence organisations with the capacity to address key operational challenges—uncertainty, governance dysfunctions, bias, and corruption—while ensuring resilience and adaptability in the face of future challenges?"

The evidence presented in this thesis demonstrates that a competitive defence framework can be both conceptualised and operationalised through a multidimensional design that integrates strategic, institutional, and behavioural dimensions.

Conceptualisation. Competitive defence is best understood as a seven-domain architecture (table 19) encompassing:

1. Strategic comprehension (anticipating change and aligning goals);
2. Competitive positioning (sustaining advantage in strategic rivalry);
3. Organisational adaptation (realigning institutions with strategic imperatives);
4. Capability, innovation, and procurement agility (building modular and innovative capacity);
5. Resilience and continuity (ensuring institutional and societal endurance under disruption);

6. Leadership and human capital (developing adaptive, ethical, and diverse leadership pipelines); and
7. Performance and strategic learning (evaluating outcomes and embedding feedback loops).

Together, these domains provide the minimum architecture required for a defence posture capable of addressing uncertainty, overcoming dysfunction, and sustaining legitimacy.

Operationalisation. To translate this architecture into practice, the framework requires a dual-track, modular, and context-sensitive approach anchored in transparent oversight. Four operational principles are central:

- Structural and behavioural co-implementation. Institutional instruments (e.g., legal clarity, e-procurement systems, empowered oversight bodies, independent audits) must be paired with behavioural measures (e.g., leadership development, meritocratic HR, professional ethics training). Neither track alone is sufficient; effectiveness derives from their integration.
- Embedded adaptability. Continuous foresight practices (scenario libraries, horizon scanning, red-teaming) and modular acquisition systems (open architectures, rapid upgrade paths) institutionalise responsiveness to uncertainty and technological change.
- Codified crisis governance. Explicit protocols (temporary delegations, emergency authorisations, mandatory retro-audits, and sunset clauses) preserve agility under stress while safeguarding accountability in recovery.
- Accountability and external verification. Each indicator in table 19 is linked to designated governance owners, independent auditors, and external levers (alliances, donor conditionality, civil-society monitoring, and investigative media), ensuring that reforms are reinforced where domestic incentives are weak.

Synthesis. Only when these elements are implemented in a context-sensitive manner—adapted to specific political, institutional, and cultural conditions—can defence organisations reliably mitigate uncertainty, governance dysfunctions, bias, and corruption while preserving resilience and adaptability.

In direct answer to the General RQ: a competitive defence framework is conceptualised as a seven-domain architecture that integrates strategic adaptability,

institutional coherence, and governance integrity, and it is operationalised through a dual-track, modular, and audit-anchored system of reforms that embeds foresight, incentivises behavioural transformation, codifies crisis governance, and ties accountability to independent and external verification. This design equips defence organisations not only to respond to present vulnerabilities but also to adapt and endure in the face of future challenges.

In sum, chapter 5 has demonstrated how the abductive and realist-informed synthesis integrates the findings from RQ1, RQ2, and RQ3 into a coherent operational framework. By conceptualising competitive defence as a seven-domain architecture and operationalising it through a dual-track, context-sensitive, and audit-anchored approach, this discussion has provided a structured and actionable answer to the General RQ. The framework is not presented as a definitive solution but as a robust and adaptable design, open to refinement through further empirical application and comparative testing. Chapter 6 now turns to the broader implications of these findings, situating the framework within the wider field of defence studies and outlining its relevance for both scholarly debate and policy practice.

6. Conclusion and recommendations

This final chapter consolidates the main insights of the thesis, situating them within the broader debates on defence planning, institutional reform, and governance. It synthesises the findings considering the research objectives, highlights the theoretical and practical contributions, and advances policy recommendations for strengthening defence competitiveness. The chapter also reflects on limitations and directions for future research, before closing with broader remarks on the significance of the proposed frameworks and the novel definition of competitive defence.

6.1 Contextualizing the research theme

This thesis has examined the complex and interrelated challenges that undermine contemporary defence planning: (1) unresolvable uncertainty in the strategic environment, (2) structural and institutional barriers to coherent decision-making, and (3) behavioural dysfunctions such as ambition, bias, rent-seeking, and corruption. These three problem clusters—summarised respectively in table 1 (uncertainty categories), table 2 (structural barriers), and table 3 (behavioural dysfunctions)—have framed the research and motivated the development of a competitive defence framework that links adaptive strategy with institutional reform and governance integrity.

Unresolvable uncertainty—defined here as the type of strategic ambiguity that cannot be eliminated through additional intelligence or conventional probabilistic modelling—remains a permanent feature of defence planning. Black swan events, disruptive technological breakthroughs, and adversaries' adaptive strategies all illustrate the limits of traditional long-term planning. The analysis has demonstrated that uncertainty must therefore be addressed not through rigid programme designs but by institutionalising foresight, scenario testing, red-teaming, and flexible resource allocation mechanisms.

Structural and institutional barriers further exacerbate vulnerability. Interservice rivalry, fragmented governance, procurement bottlenecks, and weak oversight mechanisms repeatedly obstruct the development of coherent capability portfolios. The analysis of reforms showed that these challenges can be mitigated through doctrinal integration, joint education and training, budgetary alignment, adaptive procurement processes, and strengthened civilian oversight. Yet, reforms are most effective when they are accompanied by cultural transformation—particularly the cultivation of jointness, interoperability, and accountability.

The third dimension of the research addressed behavioural dysfunctions. Comparative case studies of Belgium, Canada, Austria, and Ukraine revealed how individual ambition, entrenched bias, and corrupt practices distort decision-making and resource allocation. While these pathologies vary in intensity and form, they consistently erode effectiveness and legitimacy. At the same time, the cases also illustrated that reform is possible: wartime urgency in Ukraine accelerated transparency initiatives; Canadian and Belgian parliamentary scrutiny shed light on procurement inefficiencies; and Austrian scandals underscored the consequences of weak oversight.

The urgency of addressing these issues is underscored by the broader geopolitical context. The Russian Federation's renewed aggression against Ukraine and the ongoing war since 2022 have revealed the costs of strategic surprise and institutional fragility, while also catalysing significant reforms at both national and alliance levels. NATO's adaptation since 2014 has highlighted the importance of institutional resilience, confirming that alliances can respond effectively to systemic shocks when equipped with foresight mechanisms, flexible structures, and robust democratic oversight.

By situating defence competitiveness at the intersection of adaptive planning, institutional design, and governance integrity, this thesis has argued that military power alone is insufficient to guarantee resilience. The study introduces a novel definition of competitive defence, understood as the capacity of defence organisations to sustain advantage through strategic adaptability, structural coherence, and behavioural integrity. The framework developed in chapter 5 synthesises these insights into a multidimensional architecture and an operational roadmap that integrates structural reforms with behavioural safeguards.

6.2 Summary of the methodology

The methodological orientation of this thesis was grounded in an abductive and realist-informed approach, designed to capture the complexity of defence planning under conditions of uncertainty. Abduction allowed for an iterative movement between theory and empirical evidence, enabling conceptual refinement in light of observed institutional dynamics. Realist principles provided an analytical lens to examine how specific contexts, mechanisms, and outcomes interact to generate either dysfunction or reform in defence institutions.

To operationalise this orientation, the study employed a multi-method qualitative design. The foundation of the research was a systematic analysis of policy documents, parliamentary reports, strategic reviews, and scholarly literature, which provided insights

into the three core problem clusters outlined in tables 1, 2 and 3. These diagnostic tables ensured that the subsequent analysis rested on a transparent and structured classification of challenges.

This documentary base was complemented by a set of comparative case studies—Belgium, Canada, Austria, and Ukraine—chosen for their diversity of institutional contexts and reform trajectories. These cases allowed for the identification of recurring dysfunctions, the mapping of different reform pathways, and the assessment of how governance structures shape outcomes. In parallel, a process-tracing analysis of NATO's adaptation from 2014 to 2025, focusing on its response to systemic shocks such as Russia's annexation of Crimea and the subsequent war in Ukraine, provided evidence of institutional learning and reform under systemic crisis, offering a crucial alliance-level perspective. This analysis demonstrated how an alliance can integrate foresight, flexibility, and accountability into its institutional structures, thereby providing a critical empirical anchor for the competitive defence framework.

The methodology was designed to link diagnosis with prescription. By moving from the identification of dysfunctions to the design of remedies, the research culminated in the development of the operational framework presented in table 19, which translates the conceptual definition of competitive defence into actionable reform domains and monitoring indicators.

Throughout the research, triangulation was employed to enhance validity. Findings were cross-checked across multiple sources and cases, ensuring that conclusions did not rest on single observations. At the same time, limitations were recognised: reliance on documentary evidence restricted direct access to decision-making processes, and the selection of primarily Euro-Atlantic cases introduced a Western bias that limits global generalisability.

Despite these constraints, the methodological design provided a robust platform for linking theoretical insights with empirical realities. It enabled the thesis to generate both conceptual contributions—most notably the first systematic definition of competitive defence—and practical recommendations that are directly relevant to policymakers and defence practitioners operating in volatile strategic environments.

6.3 Synthesis of key findings

This thesis has examined how defence organisations can strengthen their competitiveness in an environment characterized by uncertainty, institutional fragmentation,

and behavioural distortions. The following synthesis consolidates the principal findings in relation to the three specific research objectives established in chapter 1.

First, managing unresolvable uncertainty. The study confirmed that uncertainty is not a temporary condition to be eliminated but a structural feature of defence planning. Table 1 identified the main categories of unresolvable uncertainty, ranging from geopolitical volatility to disruptive technologies and hybrid threats. No intelligence system or predictive model can fully capture these dynamics. The research therefore highlighted the necessity of embedding adaptive frameworks into institutional practice. Scenario-based planning, red-teaming, and risk-informed decision-making emerged as indispensable tools for coping with ambiguity. NATO's adaptation since 2014 provided clear evidence that rigid planning cycles are insufficient, and that resilience requires institutionalised foresight, flexible force structures, and iterative learning processes. Table 9 presented a framework for adaptive defence planning that addresses the uncertainties outlined in table 1. Its strength lies in the emphasis on continuous monitoring, learning, and adaptation. Validation results (C, PV, NI, AA) confirmed its analytical value while also identifying areas for refinement. By implementing this framework, defence organisations can strengthen their ability to anticipate, adapt to, and mitigate the challenges posed by an increasingly complex and uncertain environment.

Second, addressing structural and institutional barriers. The analysis of dysfunctions, detailed in table 2, demonstrated how interservice rivalry, fragmented governance, procurement inefficiencies, and weak oversight undermine coherence and efficiency. The reform pathways mapped in table 17 highlighted doctrinal integration, joint education, budgetary alignment, adaptive procurement, and strengthened civilian oversight as key levers of change. Importantly, the findings showed that reforms succeed only when supported by cultural transformation. Jointness and interoperability must be embedded in doctrine, professional education, and institutional identity. Table 18 reinforced these insights by mapping dysfunctions against specific countermeasures, showing that each problem is addressed by a targeted, operationally actionable solution. When embedded into routines, these measures improve coherence, transparency, and adaptability.

Third, mitigating behavioural dysfunctions. Comparative case studies of Belgium, Canada, Austria, and Ukraine revealed the pervasive influence of ambition, bias, rent-seeking, and corruption on defence decision-making as diagnosed in table 3. These dysfunctions distort capability development, skew resource allocation, and erode legitimacy.

Yet the cases also demonstrated opportunities for reform: wartime pressures in Ukraine accelerated transparency initiatives; Canadian and Belgian parliamentary scrutiny exposed inefficiencies; and Austrian scandals underscored the costs of weak oversight.

The evidence suggests that effective and sustainable reform requires a dual-track approach. Structural measures—such as legal frameworks, oversight mechanisms, and digital traceability—provide formal safeguards, while behavioural interventions—such as leadership practices, training, and cultural change—ensure those safeguards are internalised. Reforms relying only on institutional fixes risk "paper compliance," while behavioural reforms without institutional reinforcement tend to fade. Successful cases integrated both tracks, combining legal and regulatory clarity, professionalisation and capacity-building, digital and analytical tools, leadership incentives and cultural reforms. Table 5 offered an analytical framework distinguishing structural/institutional solutions from behavioural/leadership interventions, facilitating systematic cross-case comparison.

Overall synthesis. Taken together, the findings establish that defence competitiveness is a multidimensional phenomenon. It depends not only on material capabilities but also on the institutional capacity to adapt, reform, and uphold accountability. Structural reforms without behavioural safeguards remain fragile, while behavioural integrity without adaptive institutions is insufficient. The research therefore validates the competitive defence framework, which integrates adaptive planning under uncertainty, structural reforms to enhance coherence and efficiency, and behavioural safeguards to ensure transparency and legitimacy. Its practical architecture is operationalised in table 19, which sets out seven reform domains and links them to measurable indicators.

6.4 Theoretical contributions

Beyond its empirical findings, this thesis makes several contributions to the academic literature on defence studies, institutional theory, and governance. The core innovation lies in the articulation of competitive defence as a novel conceptual framework that integrates strategic adaptability, institutional reform, and behavioural integrity.

First, contribution to the study of planning under uncertainty. The thesis advances scholarship by demonstrating that unresolvable uncertainty cannot be addressed solely through predictive models or intelligence refinement. Instead, it requires institutionalised adaptive mechanisms, such as scenario libraries, red-teaming, and iterative learning. By linking uncertainty management directly to institutional design (see table 9), the study extends theoretical work on resilience and risk governance.

Second, contribution to institutional and organisational theory. The analysis of structural and institutional barriers enriches literature on organisational dysfunction by showing how rivalry, fragmented governance, and procurement inefficiencies persist even in advanced democracies. Reform is most effective when it combines structural change (doctrinal integration, procurement reform, oversight) with cultural transformation (jointness, interoperability). Table 17 and table 18 demonstrate this complementarity, adding nuance to theories of institutional change by highlighting the interaction of formal rules and informal practices.

Third, contribution to civil–military relations and governance studies. The findings underscore that democratic legitimacy is not an external constraint but an integral component of defence competitiveness. Oversight mechanisms—parliamentary hearings, independent audits, transparency measures—not only safeguard accountability but also enhance strategic coherence by aligning defence with societal expectations. This perspective reframes democratic control as a positive enabler of effectiveness, rather than a mere constraint.

Fourth, contribution to comparative defence studies. The comparative cases of Belgium, Canada, Austria, and Ukraine, combined with the NATO process-tracing, add to comparative research on defence reform. They reveal recurring patterns of dysfunction, while also identifying enabling conditions for transformation. The inclusion of Ukraine expands the scope of civil–military studies beyond stable democracies, offering insights into reform under crisis.

Fifth, conceptual innovation. The most significant contribution is the proposed definition of competitive defence, understood as the capacity of defence organisations to sustain advantage in a volatile environment through strategic adaptability, structural coherence, and behavioural integrity. What distinguishes this study is that the definition was not posited in the abstract but constructed cumulatively through successive analytical stages.

- Tables 1–3 established the diagnostic baseline of uncertainty, institutional barriers, and behavioural dysfunctions.
- Table 5 introduced the dual-track logic, distinguishing structural/institutional from behavioural/leadership interventions.
- Tables 6 and 7 developed complementary strategic logics, integrated in table 8 as a coherent framework for defence in complex adaptive environments.
- Table 9 provided an adaptive planning framework validated through scenario categories.

- Tables 17 and 18 mapped reform pathways and matched dysfunctions to targeted countermeasures.
- Table 19 synthesised these insights into the seven-domain architecture of competitive defence, specifying a dual-track, modular, context-sensitive, audit-anchored approach.

This sequential construction demonstrates that the framework is both conceptually rigorous and empirically grounded. By integrating institutional instruments (legal clarity, oversight, digital traceability) with behavioural measures (leadership development, ethics training, cultural reform), the framework provides a theoretically grounded yet operationally actionable model.

Collectively, these contributions establish competitive defence as a novel theoretical construct that synthesises insights from strategic studies, institutional theory, and governance. By emphasising the interdependence of adaptability, structural coherence, and behavioural integrity, the thesis provides a conceptual model with relevance not only to Euro-Atlantic institutions but also to global debates on security governance under systemic volatility. The cumulative logic from tables 1–3 through table 19 makes clear that the definition of competitive defence is not simply a proposal but the outcome of a structured, multi-stage research design.

6.5 Policy and practice recommendations

The findings of this research yield policy and practice recommendations designed to strengthen the competitiveness of defence organisations. These recommendations are structured across four complementary levels—strategic, institutional, operational, and governance—reflecting the multidimensional character of defence competitiveness. They are further informed by the dual-track approach (institutional + behavioural) validated in the case studies and operationalised in the seven-domain framework of table 19.

At the strategic level, the principal challenge lies in managing unresolvable uncertainty. MoDs and alliances should embed adaptive planning and foresight mechanisms within their national security strategies. This requires institutionalising scenario-based planning, red-teaming, and horizon-scanning capacities to ensure preparedness for strategic shocks (see table 9). Defence strategies must also be conceived as living documents, reviewed and updated regularly in response to shifting threat environments. At the same time, governments should promote whole-of-government coordination, ensuring that defence planning is integrated with diplomacy, economic resilience, and societal security

measures. The logic underpinning table 8—linking strategic comprehension, competitive positioning, and organisational adaptation—provides a template for ensuring that strategic foresight is embedded across the policy cycle.

At the institutional level, reforms must address entrenched dysfunctions identified in table 2 and mapped against solutions in table 17 and table 18. This includes:

- Doctrinal integration across services to reduce rivalry;
- JPME and exchange programmes to cultivate jointness;
- Flexible budgetary frameworks that enable cross-service alignment;
- Adaptive procurement systems that employ modular designs and open architectures.

Crucially, these institutional reforms must be paired with behavioural change: cultural transformation, leadership incentives, and professionalisation. Without this dual-track integration, reforms risk superficial compliance and short-lived impact.

At the operational level, competitiveness depends on interoperability and resilience. Recommendations include:

- Prioritising interservice and multinational exercises and integrated training programmes to strengthen cohesion and readiness within services, alliances and coalitions;
- Orienting procurement processes towards modular capability design, enabling armed forces to adapt rapidly to technological advances and evolving threats;
- Embedding resilience metrics in planning to address vulnerabilities in cyber, logistics, and supply chains;
- Using digital traceability and transparency tools to monitor procurement and operational expenditure.

As highlighted in table 5, distinguishing between institutional fixes and behavioural interventions is essential to ensure that operational reforms are not undermined by informal practices.

At the governance level, democratic oversight and accountability mechanisms are central to sustaining legitimacy. MoDs should strengthen parliamentary scrutiny, supported by access to expertise and independent analysis. Procurement processes must be made transparent, with independent audit agencies empowered to investigate irregularities. Civilian control should be codified in clear legal frameworks that delineate responsibilities between political leaders and military commanders, while safeguarding the professional

autonomy of the armed forces within defined boundaries. In addition, governments should invest in public communication and transparency initiatives, with external checks from civil society, media, and international partners (as seen in Ukraine). Oversight should not be conceived as a constraint on military effectiveness, but as an enabler of strategic coherence and legitimacy, consistent with the framework in table 19.

The progression of tables across this thesis shows how these recommendations rest on a cumulative and systematic logic. Diagnostic insights from tables 1–3 defined the problem space; table 5 introduced the dual-track analytical lens; table 8 articulated an integrated strategic framework for navigating complex environments; table 9 provided a validated adaptive planning model; and tables 17–18 identified actionable reform pathways. These insights converge in table 19, which operationalises the definition of competitive defence into a seven-domain framework with measurable indicators.

Taken together, these recommendations underscore that competitive defence is not reducible to budgets or technologies. It is the product of strategic adaptability, institutional coherence, operational interoperability, and democratic legitimacy. Implemented holistically, as outlined in table 19, they provide a roadmap for states and alliances to strengthen resilience in an era of enduring uncertainty and systemic competition.

6.6 Implementation roadmap and monitoring

The operational framework presented in table 19 was translated in section 5.4.10 into a detailed implementation roadmap and M&E regime. That section specified phased objectives, activities, actors, deliverables, and risk-mitigation measures, together with a structured M&E cycle based on routine scoring, independent verification, and periodic in-depth review. The purpose of this concluding section is not to reproduce those operational details, but to draw out the broader lessons and strategic logic that underpin implementation.

Successful institutional change cannot be delivered in a single leap. The phased approach in 5.4.10 illustrates the importance of starting with baseline assessment and quick wins (Phases 1 and 2), moving into institutional embedding and scaling (Phase 3), and only then advancing to consolidation and long-term transformation (Phases 4 and 5). This sequencing reflects the cumulative logic of the framework: early confidence-building reforms create the political and organisational space for deeper cultural and structural change.

Reform measures must be aligned with broader whole-of-government and alliance processes. The roadmap shows that national implementation gains traction when embedded

in NATO, EU, or regional cooperative frameworks, ensuring that reforms strengthen interoperability and resilience across multiple levels of governance.

The M&E regime outlined in 5.4.10 is not a compliance exercise but a mechanism for causal learning and adaptive management. Routine scoring provides continuous feedback, independent verification strengthens legitimacy and trust, and periodic in-depth reviews allow for course correction when conditions change. By integrating M&E into the reform cycle, the roadmap ensures that competitive defence remains a living framework, responsive to evolving threats and institutional performance.

As noted in 5.4.10, implementation progress can be tracked through multiple categories of indicators:

- Efficiency (e.g., procurement cycle times, cost control);
- Effectiveness (e.g., interoperability in joint exercises, capability integration);
- Governance (e.g., oversight frequency, transparency scores);
- Cultural (e.g., joint education participation, surveys on interservice trust).

Assigning responsibility for these indicators, combined with external verification, prevents “paper compliance” and reinforces accountability.

Perhaps the most important lesson from the roadmap is that implementation is not a one-off project but an iterative cycle of adaptation. Phased sequencing, structured M&E, and alignment with alliance frameworks must be sustained by political will, leadership incentives, and institutionalised learning mechanisms. Only then can defence organisations maintain the resilience and adaptability required by the competitive defence framework.

In sum, the detailed roadmap and M&E regime provide the operational guidance, while this conclusion underscores the strategic principles of sequenced reform, adaptive monitoring, and sustained learning. Together, they ensure that the seven-domain architecture of table 19 is not merely a conceptual construct, but a practicable pathway for institutional transformation under conditions of systemic uncertainty.

6.7 Limitations and future research

No research design is without limitations, and this thesis is no exception. Acknowledging these constraints is essential not only for transparency but also for guiding future scholarship in the field of defence studies and institutional reform.

First, case selection and geographic scope. The empirical analysis relied primarily on Euro-Atlantic contexts—Belgium, Canada, Austria, Ukraine, and NATO. While these cases provided diversity in terms of size, institutional maturity, and political culture, the selection

nonetheless reflects a Western orientation. As a result, the findings cannot be assumed to apply directly to non-Western or Global South contexts, where defence institutions operate under different political, economic, and cultural conditions. Future research should extend the analysis to include Asian, African, and Latin American cases to test the broader applicability of the competitive defence framework.

Second, reliance on documentary analysis. The methodology was based largely on secondary sources, official documents, and open-access policy reports. While this approach enabled triangulation and breadth, it also limited access to the inner dynamics of decision-making processes, which often remain classified or shielded from public scrutiny. Future work would benefit from incorporating elite interviews, participant observation, and archival research, which could offer richer insights into the micro-mechanisms of institutional reform and dysfunction.

Third, temporal and contextual constraints. The research captured institutional reforms within a defined timeframe (2014–2025), marked by NATO's post-Crimea adaptation and the Russian invasion of Ukraine. Although this period was highly revealing, it also represented a moment of exceptional crisis. The durability of reforms initiated under wartime or high-pressure conditions remains uncertain. Longitudinal studies, tracking reforms over extended periods and across varying threat environments, are necessary to assess whether the gains observed can be sustained in more stable contexts.

Fourth, scope of emerging domains. While the thesis acknowledged the role of disruptive technologies, cyber resilience, and hybrid threats, these issues were not analysed in depth. Yet, the future of defence competitiveness will increasingly hinge on the ability to integrate artificial intelligence, cyber defence, space security, and climate-related risks into institutional planning. Future research should investigate how these domains reshape both structural reforms and behavioural incentives, particularly as they challenge traditional boundaries between military, civilian, and private-sector actors.

Despite these limitations, this thesis provides a robust conceptual and empirical foundation for further inquiry. By identifying the interplay between uncertainty, institutional structures, and behavioural dynamics, it offers a framework that is both adaptable and open to refinement. Future research should build on this foundation to test, extend, and diversify the competitive defence framework, ensuring its relevance across contexts and over time. In particular, future research should test and refine the proposed definition of competitive defence, applying it beyond Euro-Atlantic settings and across emerging domains such as AI,

cyber, space, and climate security, where institutional resilience and behavioural integrity may manifest differently.

6.8 Concluding remarks

This thesis has argued that the competitiveness of defence institutions cannot be reduced to the size of their budgets or the sophistication of their technologies. Instead, competitiveness derives from the capacity to adapt under uncertainty, reform structural weaknesses, and uphold democratic accountability. Defence organisations that succeed in these three domains are more likely to maintain resilience in the face of strategic shocks, to optimise resource allocation, and to preserve legitimacy in the eyes of their societies.

This study has demonstrated that uncertainty is not a temporary obstacle but a permanent condition of the security environment. Structural barriers—interservice rivalry, fragmented governance, and procurement inefficiencies—persistently undermine coherence, while behavioural dysfunctions—ambition, bias, and corruption—erode effectiveness and trust. Yet, the analysis has also shown that these challenges are not insurmountable. Through adaptive planning, institutional reform, and cultural transformation, defence organisations can cultivate the agility and integrity required to compete effectively.

Across the research, several frameworks were developed to diagnose dysfunctions (tables 1–3), map reform pathways (tables 5, 17, 18), and integrate adaptive and strategic logics (tables 6–9). These culminated in the competitive defence framework operationalised in table 19, which synthesises the insights into a multidimensional model that integrates strategy, institutions, and behaviour. It provides both a conceptual contribution to academic debates and a practical roadmap for policymakers and practitioners. The framework underscores that defence is not only about material strength but also about the quality of the institutions that shape how resources are used, how strategies are made, and how societies are defended.

Looking forward, the urgency of reform is clear. The war in Ukraine, the rapid evolution of disruptive technologies, and the intensification of systemic competition signal that the coming decades will be marked by volatility. In such a world, defence institutions that fail to adapt risk falling into strategic irrelevance. Those that embrace the principles of competitive defence, by contrast, will be better positioned to safeguard national security while upholding the values of transparency, accountability, and democratic legitimacy.

In conclusion, this thesis has sought to demonstrate that competitive defence is not merely an analytical construct but a practical imperative. It advances the novel definition of

competitive defence as the capacity of defence institutions to sustain advantage in a volatile environment through strategic adaptability, structural coherence, and behavioural integrity. It invites both scholars and practitioners to recognise that the future of defence lies not only in weapons systems or budgets but in institutions capable of reforming themselves, integrating diverse actors, and sustaining legitimacy in the face of enduring uncertainty.

References

Acciarini, C., Brunetta, F., & Boccardelli, P. (2021). Cognitive biases and decision-making strategies in times of change: A systematic literature review. *Management Decision, 59*(6), 1249–1274. https://doi.org/10.1108/MD-07-2019-1006

Akhlaq, A. (2024). Navigating hybrid governance: Role of Pakistan National Security Committee & constitutional outlook. *Policy Perspectives, 21*(1), 103–126. https://doi.org/10.13169/polipers.21.1.ra6

Alberts, D. S., & Hayes, R. E. (2003). *Power to the edge: Command...Control...in the information age*. CCRP Publication Series.

Aligica, P. D., & Tarko, V. (2014). Crony capitalism: Rent seeking, institutions and ideology. *Kyklos, 67*(2), 156–176. https://doi.org/10.1111/kykl.12048

AlixPartners. (2024, May 9). *The P is for performance: Rethinking the opportunity of PBL in defense aircraft sustainment*. https://www.alixpartners.com/insights/102j746/the-p-is-for-performance-rethinking-the-opportunity-of-pbl-in-defense-aircraft-s/

Andersen, S. C., & Hjortskov, M. (2016). Cognitive biases in performance evaluations. *Journal of Public Administration Research and Theory, 26*(4), 647–662. https://doi.org/10.1093/jopart/muv036

Amer, M., Daim, T. U., & Jetter, A. (2013). A review of scenario planning. *Futures*, *46*, 23–40. https://doi.org/10.1016/j.futures.2012.10.003

Atlantic Council. (2024, January). *Commission on Defense Innovation Adoption: Final report* (W. M. McNamara, P. Modigliani, M. MacGregor, & E. Lofgren, Authors; M. T. Esper & D. L. James, Co-Chairs). Scowcroft Center for Strategy and Security. https://www.atlanticcouncil.org/wp-content/uploads/2024/01/Commission-on-Defense-Innovation-Adoption-Final-Report.pdf

Auerswald, D., Lagassé, P., & Saideman, S. M. (2023). Some assembly required: Explaining variations in legislative oversight over the armed forces. *Foreign Policy Analysis*, orac034. https://doi.org/10.1093/fpa/orac034

Aven, T. (2011). *Quantitative risk assessment: The scientific platform.* Cambridge University Press.

Bankauskaite, D., & Šlekys, D. (2023). Lithuania's total defense review: Building a whole-of-government approach to national security and resilience. *PRISM*, *10*(2), 54–77.

https://ndupress.ndu.edu/Portals/68/Documents/prism/prism_10-2/prism_10-2_54-77_Bankauskaite-Slekys.pdf?ver=yCSzV0mxPhea2goEgQiXLA%3d%3d

Barnes, J. (1984). Cognitive biases and their impact on strategic planning. *Strategic Management Journal, 5*(2), 129–137. https://doi.org/10.1002/smj.4250050204

Barroso, L. (2018). A Grande Guerra em Angola: A expedição de Alves Roçadas e de Pereira D'Eça na estratégia intervencionista. *Ler História, 72*, 129-149. https://doi.org/10.4000/lerhistoria.3524

Bartolomeu, J. P. S., & Água, P. B. (2022). *A framework for assessing the impacts of potentially disruptive military technologies*. https://www.researchgate.net/publication/369203258_A_FRAMEWORK_FOR_ASSESSING_THE_IMPACTS_OF_POTENTIALLY_DISRUPTIVE_MILITARY_TECHNOLOGIES

Bauhr, M., Czibik, Á., De Fine Licht, J., & Fazekas, M. (2020). Lights on the shadows of public procurement: Transparency as an antidote to corruption. *Governance*, *33*(3), 495–523. https://doi.org/10.1111/gove.12432

BBC News. (2017, February 16). Austria to sue Airbus over Eurofighter contract. *BBC News*. https://www.bbc.com/news/business-38990137

Beach, D., & Pedersen, R. B. (2019). *Process-tracing methods: Foundations and guidelines* (2nd ed.). University of Michigan Press

Beck, U. (1992). *Risk society: Towards a new modernity.* SAGE.

Bekkers, F., & Spiegeleire, S. (2010). Strategic agility and defence capability options: Who says generals can't dance? In *Deelverkenning III: Aanbodzijde. Houvast voor de krijgsmacht van de toekomst* [Future policy research] (pp. 427–463). Netherlands Ministry of Defence.

Bennett, A., & Checkel, J. T. (2012). *Process tracing: From philosophical roots to best practices* (Simons Papers in Security and Development No. 21/2012). School for International Studies, Simon Fraser University. https://summit.sfu.ca/item/14884

Berkhout, F., & Hertin, J. (2002). Foresight futures scenarios: Developing and applying a participative strategic planning tool. *Greener Management International, (37)*, 37–52.

Besch, S., & Westgaard, K. (2024). *Europe's conscription challenge: Lessons from Nordic and Baltic states*. Carnegie Endowment for International Peace. https://carnegie-

production-assets.s3.amazonaws.com/static/files/Besch_Westgaard_Conscription_2024.pdf

Bilokin, D. S., & Kostenko, V. I. (2025). Financial and legal regulation of defense procurement. *Analytical and Comparative Jurisprudence*, (1), 399–404. https://doi.org/10.24144/2788-6018.2025.01.65

Bishop, P., & Hines, A. (2012). *Teaching about the future*. Palgrave Macmillan.

Bjørgul, L., & Sellevåg, S. R. (2022). *Scenarios as a tool to increase resilience against foreign influence: A Norwegian example*. NATO STO. https://www.sto.nato.int/publications/STO%20Meeting%20Proceedings/STO-MP-HFM-361/MP-HFM-361-P09.pdf

Bland, D. L. (1999). A unified theory of civil-military relations. *Armed Forces & Society, 26*(1), 7–25. https://doi.org/10.1177/0095327X9902600102

Blenkin, M. (2024, March 25). *Government to create Joint Statutory Committee on Defence*. Australian Defence Magazine. https://www.australiandefence.com.au/news/news/government-to-create-joint-statutory-committee-on-defence

Boucher, P., Bentzen, N., Lațici, T., Madiega, T., Schmertzing, L., & Szczepański, M. (2020). *Disruption by technology: Impacts on politics, economics and society*. European Union.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27–40. https://doi.org/10.3316/QRJ0902027

Braithwaite, R. (2011). *Afgantsy: The Russians in Afghanistan 1979–89*. Oxford University Press.

Brans, M., & Hondeghem, A. (2005). *Competency frameworks in the Belgian governments: Causes, construction and contents*. *Public Administration, 83*(4), 823–837. https://doi.org/10.1111/j.0033-3298.2005.00478.x

Breitenbauch, H., & Jakobsson, A. (2018). Defence planning as strategic fact: Introduction. *Defence Studies, 18*(3), 253–261. https://doi.org/10.1080/14702436.2018.1497443

Brilingaitė, A., Bukauskas, L., Juozapavičius, A., & Kutka, E. (2022). Overcoming information-sharing challenges in cyber defence exercises. *Journal of Cybersecurity, 8*, tyac001. https://doi.org/10.1093/cybsec/tyac001

Briones-Peñalver, A. J., Bernal-Conesa, J. A., & de Nieves Nieto, C. (2020). Knowledge and innovation management model: Its influence on technology transfer and

performance in the Spanish defense industry. *International Entrepreneurship and Management Journal, 16*(2), 595–615. https://doi.org/10.1007/s11365-019-00577-6

Brynjolfsson, E., & McAfee, A. (2017). *Machine, platform, crowd: Harnessing our digital future.* W. W. Norton & Company.

Buell, W. A., Dorrance, E., & West, R. (2018). Transregional capstone exercise: Training for tomorrow's fight. *Joint Force Quarterly, 90*(3), 30–35. https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-90/jfq-90_30-35_buell-et-al.pdf?ver=2018-04-11-125441-307

Bukkvoll, T., & Solovian, V. (2019). The threat of war and domestic restraints to defence reform: How fear of major military conflict changed and did not change the Ukrainian military, 2014–2019. *Defence Studies*, *19*(4), 376–395. https://doi.org/10.1080/14702436.2019.1704176

Byers, M., & Webb, S. (2011). Canada's F-35 purchase is a costly mistake. *Canadian Foreign Policy Journal, 17*(3), 217–227. https://doi.org/10.1080/11926422.2011.638193

Cascio, J. (2020). Facing the age of chaos. *Medium*. https://medium.com/@cascio/facing-the-age-of-chaos-b00687b1f51d

Castilla, J. C. (2024). *From public defence policy to defence planning: About enhancing the EU processes and complementary with NATO* [Doctoral dissertation, Universidad Nacional de Educación a Distancia (España)].

Centre for Army Leadership. (n.d.). *The Army Leadership Code: An introductory guide* [PDF version]. https://www.army.mod.uk/media/2698/ac72021_the_army_leadership_code_an_introductory_guide.pdf

Centre for Integrity in the Defence Sector. 2017. Guides to good governance 5. Managing the risks of real estate corruption and fraud in the defence sector. Oslo. https://www.nato.int/nato_static_fl2014/assets/pdf/2020/7/pdf/200724-BI-GGG5-en.pdf

Center for Strategic and International Studies. (2022, February 16). *Project Convergence: An experiment for multidomain operations* [Transcript]. https://www.csis.org/analysis/project-convergence-experiment-multidomain-operations

Chambre des représentants de Belgique. (2023, October 31). *Note de politique générale: Défense et victimes de guerre et victimes à la suite d'actes de terrorisme* (Doc. 55 3649/2023–2024, No. 002–021). https://www.lachambre.be/FLWB/PDF/55/3649/55K3649022.pdf

Chauhan, A. (2024). *Cognitive biases in decision making* [Preprint]. https://d197for5662m48.cloudfront.net/documents/publicationstatus/224611/preprint_pdf/4601a7c6e16a26c23472228daebe82a5.pdf

Cheung, T. M., Mahnken, T. G., & Ross, A. L. (2011, September). *Frameworks for analyzing Chinese defense and military innovation* (Policy Brief No. 27). University of California Institute on Global Conflict and Cooperation. https://escholarship.org/uc/item/5cr8j76s

Chiriac, C. (2022). *COPD V3.0 and implications on the joint level*. *Bulletin of "Carol I" National Defence University*, 11(2), 7–13. https://doi.org/10.53477/2284-9378-22-68

Christie, E. H. (2020). *Artificial intelligence at NATO: Dynamic adoption, responsible use*. NATO Review. https://www.nato.int/docu/review/articles/2020/11/24/artificial-intelligence-at-nato-dynamic-adoption-responsible-use/index.html

Cifuentes-Faura, J. (2024). Corruption in Ukraine during the Ukrainian–Russian war: A decalogue of policies to combat it. *Public Administration*, *102*(2), 415–424. https://doi.org/10.1002/pa.2905

Clausewitz, C. (1989). *On war* (M. Howard & P. Paret, Eds. & Trans.). Princeton University Press. (Original work published 1832)

Cole, A., & Olympiou, P. (2022). *Risk management and decision-making under uncertainty during the Afghanistan crisis 2021.* Humanitarian Outcomes. https://humanitarianoutcomes.org/sites/default/files/publications/cole_olympiou_risk-management-decision-making-under-uncertainty-during-the-afghanistan-crisis-2021.pdf

Collins, J. M. (2002). *Military strategy: Principles, practices, and historical perspectives*. Potomac Books.

Colmer, A. (2021). *Agile command and control (C2) insights paper*. Noetic Group. Emerging Disruptive Technology Assessment Symposium. https://www.dst.defence.gov.au/sites/default/files/events/documents/Agile%20C2%20Insights%20Paper%20F2.pdf

Commission on Planning, Programming, Budgeting, and Execution Reform. (2024, March 6). *Defense resourcing for the future: Final report*. https://ppbereform.senate.gov/wp-content/uploads/2024/03/Commission-on-PPBE-Reform_Full-Report_6-March-2024_FINAL.pdf

Congressional Research Service. (2022, May 2). *F-35 Joint Strike Fighter (JSF) program* (CRS Report RL30563). https://sgp.fas.org/crs/weapons/RL30563.pdf

Congressional Research Service. (2024, January 12). *Defense primer: Commanding U.S. military operations* (CRS Report No. IF10542). Federation of American Scientists. https://sgp.fas.org/crs/natsec/IF10542.pdf

Conway, M. (2015). *Foresight: An Introduction*. https://www.yccd.edu/wp-content/uploads/2020/11/Foresight-An-Introduction-Futures-Thinking-Reference-Guide-Conway.pdf

Court of Audit of Belgium [Cour des comptes]. (2019, December 4). *Capacité d'engagement de la composante Air de la Défense* [Engagement capacity of the Air Component of the Defence]. https://www.ccrek.be/sites/default/files/Docs/2019_45_CapaciteEngagementComposanteAirDefense.pdf

Court of Audit of Belgium [Cour des comptes]. (2025, May 28). *Rééquipement de la capacité motorisée de la Défense* [Re-equipment of the motorized defense capacity] (Report No. 16). https://www.ccrek.be/sites/default/files/Docs/2025_16_ReequipementDefense.pdf

Couto, A. C. (1988). *Elementos de estratégia: Apontamentos para um curso* (Vol. I). Lisboa: Instituto de Altos Estudos Militares.

Cozad, M., McCollester, M., Welch, J., & Fay, M. (2023). *Rethinking jointness? The strategic value of jointness in major power competition and conflict.* RAND Corporation. https://www.rand.org/content/dam/rand/pubs/research_reports/RRA1500/RRA1560-1/RAND_RRA1560-1.pdf

Cramer, C. S., & Franke, U. (Eds.). (2021, June 28). *Ambiguous alliance: Neutrality, opt-outs, and European defence* [Essay collection]. European Council on Foreign Relations. https://ecfr.eu/publication/ambiguous-alliance-neutrality-opt-outs-and-european-defence/

Curry, A. (2007). Acting on the future. In B. Sharpe & K. van der Heijden (Eds.), *Scenarios for success: Turning insights into action* (pp. 339–371). John Wiley & Sons.

Czibik, Á., Fazekas, M., Sanchez, A. H., & Wachs, J. (2021). Networked corruption risks in European defense procurement. In O. M. Granados & J. R. Nicolás-Carlock (Eds.), *Corruption networks* (pp. 99–120). Springer. https://doi.org/10.1007/978-3-030-81484-7_5

Darr, T. (2025, June 5). *NATO wraps up landmark deterrence exercise*. U.S. Army. https://www.army.mil/article/286097/nato_wraps_up_landmark_deterrence_exercise

Dashtipour, P. (2015). Social psychology: A commentary on organizational research. In I. Parker (Ed.), *Handbook of critical psychology* (pp. 79–87). Routledge.

Dávid-Barrett, E., & Fazekas, M. (2020). Grand corruption and government change: An analysis of partisan favoritism in public procurement. *European Journal on Criminal Policy and Research*, *26*(4), 411–430. https://doi.org/10.1007/s10610-019-09416-4

Davis, C., & Kienle, F. R. (2019). Toward a more lethal, flexible, and resilient joint force: Rediscovering the purpose of JPME II. *Joint Force Quarterly, 92*(1), 23–29. https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-92/jfq-92_23-29_Davis-Kienle.pdf

Davis Jr., G. B. (2023, March 16). *The future of NATO C4ISR: Assessment and recommendations after Madrid*. Atlantic Council. https://www.atlanticcouncil.org/in-depth-research-reports/report/the-future-of-nato-c4isr-assessment-and-recommendations-after-madrid/

Davis, P. K. (2003). Uncertainty-sensitive planning. In S. E. Johnson, M. C. Libicki, & G. F. Treverton (Eds.), *New Challenges, New Tools for Defense Decisionmaking* (pp. 131-156). RAND Corporation. https://doi.org/10.7249/MR1576

Davis, C. (2017). Jointness, culture, and inter-service prejudice: Assessing the impact of resident, satellite, and hybrid Joint Professional Military Education II course delivery methods on military officer attitudes. *[Doctoral dissertation, Old Dominion University]*. https://doi.org/10.25777/FKEZ-PD25

De Neve, A. (2022). Belgium and European strategic autonomy. In C. Lequesne & T. Tardy (Eds.), *European strategic autonomy and small states' security* (pp. 153–168). Routledge. https://doi.org/10.4324/9781003324867-11

De Winter, L. (2003). Political corruption in Belgium. In M. J. Bull & J. L. Newell (Eds.), *Corruption in contemporary politics* (pp. 93–105). Palgrave Macmillan. https://doi.org/10.1057/9781403919991_8

Defence and Security Accelerator. (n.d.). *Defence and Security Accelerator*. GOV.UK. https://www.gov.uk/government/organizations/defense-and-security-accelerator

Defence Industry Europe. (2025, August 2). *Ukraine delivers over one million FPV drones to frontline troops in first half of 2025*. Retrieved August 19, 2025, from https://defence-industry.eu/ukraine-delivers-over-one-million-fpv-drones-to-frontline-troops-in-first-half-of-2025/

Defence Ukraine. (2025, May 17). *Ukraine's defence procurement overhaul: A deep dive into transparency, domestic innovation, and wartime efficiency*. Retrieved August 19, 2025, from https://www.defenceukraine.com/en/insights/ukraines-defence-procurement-overhaul-a-deep-dive-into-transparency-domestic-innovation-and-wartime-efficiency

Defense Acquisition University. (n.d.). *Adaptive Acquisition Framework*. https://aaf.dau.edu/

Defense Industry Daily. (2020, May 26). *Eurofighter's rough ride in Austria continues*. https://www.defenseindustrydaily.com/eurofighter-set-for-rough-ride-in-austria-updated-02701/

Defense Innovation Board. (2024, July 5). *Aligning incentives to drive faster tech adoption*. Department of Defense, Office of Prepublication and Security Review. https://innovation.defense.gov/Portals/63/20240701%20DIB%20Report_Aligning%20Incentives%20PUBLISHED%20STUDY_1.pdf

Defense Systems. (2011, January 24). *A blueprint for lowering acquisition costs*. https://www.defenseone.com/defense-systems/2011/01/a-blueprint-for-lowering-acquisition-costs/192793/

Department of Defense. (2023, September). *DoD risk, issue, and opportunity (RIO) management guide for defense acquisition programs* [Government report]. https://www.dau.edu/sites/default/files/2023-10/DoD%20RIO%20Management%20Guide%2009-2023.pdf

Deschouwer, K., & Deweerdt, M. (1995). Belgian polities in 1994. *Res Publica, 37*(3–4), 313–326. https://doi.org/10.21825/rp.v37i3-4.18669

Deshpande, K. (2025). Reducing cognitive biases in strategic business decisions: A framework for enhanced leadership and organizational success. *Development and Learning in Organizations, (ahead-of-print)*. https://doi.org/10.1108/DLO-11-2024-0330

Detert, J. R., & Edmondson, A. C. (2011). Implicit voice theories: Taken-for-granted rules of self-censorship at work. *Academy of Management Journal, 54*(3), 461–488. https://doi.org/10.5465/amj.2011.61967925

Deutsche Welle. (2020, November 12). *Austrian court ends Eurofighter fraud probe*. DW. https://www.dw.com/en/austrian-court-confirms-end-to-eurofighter-fraud-investigation/a-55571026

Deveraux, A. (2023). *Whose role is it anyway? The inter-service race for the intermediate-range ballistic missile, 1955–1958.* Army University Press. https://www.armyupress.army.mil/Portals/7/Research%20and%20Books/2023/AOW%20Deveraux%20Whose%20Role%20interactive%20book%2012May2023.pdf

Dobriansky, J., & O'Farrell, P. (2018, July). *Other transaction authority: Acquisition innovation for mission-critical force readiness*. Contract Management, 58(7), 51–53. https://acquisitioninnovation.darpa.mil/docs/Articles/Contract%20Management%20Dobriansky%20OTA.pdf

Dong, Y., Bartol, K. M., Zhang, Z.-X., & Li, C. (2016). Enhancing employee creativity via individual skill development and team knowledge sharing: Influences of dual-focused transformational leadership. *Journal of Organizational Behavior, 38*(3), 439–458. https://doi.org/10.1002/job.2134

Dong, Y., Chen, X., Hunt, K., & Zhuang, J. (2020). Defensive resource allocation: The roles of forecast information and risk control. *Risk Analysis, 41*(6), 1011–1029. https://doi.org/10.1111/risa.13626

Downs, A. (1966). *Bureaucratic structure and decisionmaking* (Memorandum RM-4646-1-PR). RAND Corporation. https://www.rand.org/content/dam/rand/pubs/research_memoranda/2007/RM4646-1.pdf

Doz, Y., & Kosonen, M. (2008). The dynamics of strategic agility: Nokia's rollercoaster experience. *California Management Review, 50*(3), 95–118. https://doi.org/10.2307/41166447

Doz, Y. L., & Kosonen, M. (2010). Embedding strategic agility: A leadership agenda for accelerating business model renewal. *Long Range Planning, 43*, 370–382. https://doi.org/10.1016/j.lrp.2009.07.006

Dreisbach, T. (2016, April). *Preparing for peace: Croatia rethinks national defense, 2000–2003*. Innovations for Successful Societies, Princeton University. https://successfulsocieties.princeton.edu/sites/g/files/toruqf5601/files/TD_Military_Croatia_FORMATTED_22Apr2016_ToU_0_1.pdf

Dupont, T. (2023, February). *Shaping tomorrow's air force: Many challenges and even more opportunities! The Journal of the Joint Air Power Competence Centre, 35*. https://www.japcc.org/articles/shaping-tomorrows-air-force/

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350–383. https://doi.org/10.2307/2666999

Edmondson, A. C., & Lei, Z. (2014). Psychological safety: The history, renaissance, and future of an interpersonal construct. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 23–43. https://doi.org/10.1146/annurev-orgpsych-031413-091305

Egmont Institute. (2021, November 10). *The coordination problem in European defence planning*. Egmont – Royal Institute for International Relations. https://www.egmontinstitute.be/the-coordination-problem-in-european-defence-planning/

Egnell, R. (2013). Civil–military coordination for operational effectiveness: Towards a measured approach. *Small Wars & Insurgencies, 24*(2), 237–256. https://doi.org/10.1080/09592318.2013.778017

Ejdys, J., Gulc, A., Religa, J., Siderska, J., Szpilko, D., Szydło, J., Żurek, M., Mazur, R., & Valevatn, J. (2023). *Foresight methodology focused on application in the context of the future labor market: Foresight-oriented IT system supporting higher education and career development (FORhesIT)* (EOG/21/K4/W/0118). FORhesIT Project. https://forhesit.eu/wp-content/uploads/2023/04/FORhesIT-IO1-Foresight-Methodology_EN.pdf

Ekström, T., Hilletofth, P., & Skoglund, P. (2021). Towards a purchasing portfolio model for defence procurement: A Delphi study of Swedish defence authorities. *International Journal of Production Economics, 233*, 107996. https://doi.org/10.1016/j.ijpe.2020.107996

Elliott, C. L. (2015). *High command: British military leadership in the Iraq and Afghanistan wars*. Oxford University Press.

Enthoven, A. C., & Smith, K. W. (2005). *How much is enough? Shaping the defense program, 1961–1969* (RAND CB-403) [Reprint of the 1971 original edition]. RAND Corporation. https://www.rand.org/content/dam/rand/pubs/commercial_books/2010/RAND_CB403.pdf

European Commission. (2024). *Country profile – Benchmarking of national policy frameworks for innovation procurement: Belgium.* Directorate-General for Research and Innovation. https://ec.europa.eu/assets/rtd/innovation-procurement/country-report-2024-policy-benchm-belgium.pdf

European Commission. (2024, October 30). *Ukraine 2024 report: Accompanying the document communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions — 2024 communication on EU enlargement policy* (SWD(2024) 699 final). https://enlargement.ec.europa.eu/document/download/1924a044-b30f-48a2-99c1-50edeac14da1_en?filename=Ukraine%20Report%202024.pdf

European Commission. (n.d.). *GOVEX – your solution to public procurement*. GOVEX. https://www.govex.be/en/

European Organisation of Military Associations and Trade Unions (EUROMIL). (2024). *Better pay for the Belgian military* (Global Plan for the Upgrading of Defence Personnel: People Our Priority). https://euromil.org/better-pay-for-the-belgian-military/

European Organisation of Military Associations and Trade Unions (EUROMIL). (n.d.). *The Washington D.C. NATO Summit: EUROMIL's call to action for military recruitment and retention!*. https://euromil.org/the-washington-d-c-nato-summit-euromils-call-to-action-for-military-recruitment-and-retention/

European Training Foundation. (2014). *FRAME Foresight guide*. https://www.etf.europa.eu/sites/default/files/m/D9315C30910DE6E8C1257D5E0036883A_FRAME_Foresight%20guide.pdf

Fan, X., & Chen, Y. (2020). Contracts in a procurement supply chain with intermediation: Combating collusion in price competition. *Naval Research Logistics, 68*(10), 1054–1069. https://doi.org/10.1002/nav.21944

Fasolo, B., Heard, C., & Scopelliti, I. (2025). Mitigating cognitive bias to improve organizational decisions: An integrative review, framework, and research agenda. *Journal of Management, 51*(6), 2182–2211. https://doi.org/10.1177/01492063241287188

Feaver, P. D., & Kohn, R. H. (2021). Civil-military relations in the United States. *Strategic Studies Quarterly, 15*(2), 12–37. Air University Press. https://www.jstor.org/stable/10.2307/27032894

Federal Ministry of Defence, Austria. (n.d.). *FAQs concerning the Eurofighter procurement*. https://www.bmlv.gv.at/english/misc/tf/faq.shtml

Federal Ministry of Defence and Sports, Austria. (2017, February 16). *Eurofighter: Austrian Federal Ministry of Defence and Sports files criminal complaint against two Airbus companies* [Press release]. https://www.bmlv.gv.at/english/dynmod/artikel.php?id=4901

Fernandez, R., & Rodrik, D. (1991). Resistance to reform: *Status quo* bias in the presence of individual-specific uncertainty. *American Economic Review, 81*(5), 1146–1155. https://dash.harvard.edu/handle/1/37927057

Finer, S. E. (2002). *The man on horseback: The role of the military in politics* (J. Stanley, Introduction). Transaction Publishers. (Original work published 1962).

Finnish Government. (2025). *Security strategy for society: Government resolution – Security Committee* (Publications of the Finnish Government). https://julkaisut.valtioneuvosto.fi/handle/10024/166026

Fink, A., & Schlake, O. (2000). Scenario management: An approach for strategic foresight. *Technological Forecasting and Social Change, 65*(1), 21–35. https://www.exinfm.com/pdffiles/scenario.pdf

Fischhoff, B. (1983). Strategic policy preferences: A behavioral decision theory perspective. *Journal of Social Issues, 39*(1), 133–160. https://doi.org/10.1111/j.1540-4560.1983.tb00133.x

Flynn, B. (2022). Knowing your CJEF from your JEF: Europe's "alphabet soup" of interstitial military cooperation—What relevance for Cold War 2.0? *Defense Studies, 23*(3), 313–333. https://doi.org/10.1080/14702436.2022.2137495

Forster, R. A. (1999). *Improving Navy and Air Force tactical air forces integration.* Air Command and Staff College, Air University. https://apps.dtic.mil/sti/tr/pdf/ADA396503.pdf

Frain, A. J., & Jans, N. (2024). Burying the great man: The social identity foundations of military leadership. *Australian Army Journal*, *20*(2), 5–29. https://doi.org/10.61451/2675094

Frame, D. J. (2003). *Managing risk in organizations: A guide for managers*. Jossey-Bass.

Fransen, K., McEwan, D., & Sarkar, M. (2020). The impact of identity leadership on team functioning and well-being in team sport: Is psychological safety the missing link? *Psychology of Sport and Exercise, 51*, 101763. https://doi.org/10.1016/j.psychsport.2020.101763

Future of Defense Task Force. (2020). *Future of Defense Task Force report 2020*. https://houlahan.house.gov/uploadedfiles/future-of-defense-task-force-final-report-2020.pdf

GAN Integrity. (2020, November 5). *Austria risk report*. https://www.ganintegrity.com/country-profiles/austria/

Garamone, J. (2018, July 12). *Global integration seeks to buy leaders decision time, increase 'speed of relevance'*. Joint Chiefs of Staff. https://www.jcs.mil/Media/News/News-Display/Article/1565240/global-integration-seeks-to-buy-leaders-decision-time-increase-speed-of-relevance/

George, A. L., & Bennett, A. (2005). *Case studies and theory development in the social sciences*. MIT Press.

Gerring, J. (2007). *Case study research: Principles and practices*. Cambridge University Press.

Gil, A. C. de S. C. (2014). *O projecto NH90 e a capacidade aeromóvel no Exército Português*. *Revista Militar, 2555*, 1077-1091. https://www.revistamilitar.pt/artigo/988

Gill, P., & Phythian, M. (2018). *Intelligence in an insecure world* (3rd ed.). Polity Press.

Gleick, J. (1987). *Chaos: Making a new science.* Viking Penguin.

GlobalSecurity.org. (n.d.). *Austria - Eurofighter Typhoon*. Retrieved July 21, 2025, from https://www.globalsecurity.org/military/world/europe/eurofighter-at.htm

Godet, M. (2006). *Creating futures: Scenario planning as a strategic management tool* (2nd ed.). Economica.

Gomes, F. J. R. de M., Ramalho, J. L. P., & Martins, M. J. T. (2024, January 15). *A insustentável situação dos militares das Forças Armadas*. Grupo de Reflexão

Estratégica Independente (GREI). https://www.grei-portugal.org/docs/CartaGREI.pdf

Government Offices of Sweden, Prime Minister's Office. (2024). *National security strategy*. https://www.government.se/contentassets/dee95d002683482eba019df49db2801f/national-security-strategy_.pdf

Governo de Portugal, Ministério da Justiça. (2020). *Estratégia Nacional de Combate à Corrupção 2020–2024* [National strategy to combat corruption 2020–2024]. https://justica.gov.pt/Portals/0/Estrategia%20Nacional%20de%20Combate%20a%20Corrupcao%20-%20ENCC.pdf

Gray, C. S. (2014). *Strategy and defence planning: Meeting the challenge of uncertainty.* Oxford University Press.

Graycar, A. (2019). Mapping corruption in procurement. *Journal of Financial Crime*, *26*(1), 162–178. https://doi.org/10.1108/JFC-06-2018-0063

Grigore, C. (2023, November 9-10). *Developing a NATO capability: A case study: Joint Logistic Support Group*. Paper presented at the 18th International Scientific Conference "Defense Resources Management in the 21st Century," Braşov, Romania. https://codrm.eu/wp-content/uploads/2024/10/13_GRIGORE-Ciprian.pdf

Gu, J., Chen, Z., Huang, Q., Liu, H., & Huang, S. (2016). A multilevel analysis of the relationship between shared leadership and creativity in inter-organizational teams. *Journal of Organizational Behavior, 37*(8), 1129–1151. https://doi.org/10.1002/jocb.135

Haines, G. K., & Leggett, R. E. (Eds.). (2007). *Watching the bear: Essays on CIA's analysis of the Soviet Union*. Central Intelligence Agency.

Hammond, J. S., Keeney, R. L., & Raiffa, H. (1998). The hidden traps in decision making. *Harvard Business Review*. https://hbr.org/1998/09/the-hidden-traps-in-decision-making-2

Hannah, S. T., Avolio, B. J., & Walumbwa, F. O. (2011). Relationships between authentic leadership, moral courage, and ethical and pro-social behaviours. *Business Ethics Quarterly, 21*(4), 555–578. https://doi.org/10.5840/beq201121436

Haslam, S. A. (2004). *Psychology in organizations: The social identity approach* (2nd ed.). Sage Publications.

Headquarters Supreme Allied Commander Transformation. (2023). *Request for information RFI-ACT-SACT-23-134: Political military assisted decision making (PM-ADM)* [Request for information]. Norfolk, VA: NATO. https://www.act.nato.int/wp-content/uploads/2023/11/rfi023134.pdf

Hedlund, E., Börjesson, M., & Österberg, J. (2015). Team learning in a multinational military staff exercise. *Small Group Research, 46*(2), 179–203. https://doi.org/10.1177/1046496414568462

Heydenrych, E. (2024). Re-evaluating oversight of South African defence procurement: Can combined assurance help extract full accountability from the Department of Defence? *Scientia Militaria: South African Journal of Military Studies*, *52*(2), 25–51. https://doi.org/10.5787/52-2-1441

Hill, A., & Watson, D. (2019). The competitive environment. In T. Galvin & D. Watson (Eds.), *Strategic leadership: Primer for senior leaders* (4th ed., pp. 13-24). U.S. Army War College.

HM Government. (2023, March). *Integrated Review Refresh 2023: Responding to a more contested and volatile world*. Presented to Parliament by the Prime Minister by Command of His Majesty. https://assets.publishing.service.gov.uk/media/641d72f45155a2000c6ad5d5/11857435_NS_IR_Refresh_2023_Supply_AllPages_Revision_7_WEB_PDF.pdf

Hodicky, J., Özkan, G., Özdemir, H., Stodola, P., Drozd, J., & Buck, W. (2020). Dynamic modeling for resilience measurement: NATO resilience decision support model. *Applied Sciences*, 10(8), 2639. https://doi.org/10.3390/app10082639

Hoeffler, C., & Mérand, F. (2015). Buying a fighter jet: European lessons for Canada. *Canadian Foreign Policy Journal*. https://doi.org/10.1080/11926422.2015.1083872

Hogg, M. A., & Rast, D. E., III. (2022). Intergroup leadership: The challenge of successfully leading fractured groups and societies. *Current Directions in Psychological Science, 31*(6), 509–516. https://doi.org/10.1177/09637214221121179

Holland, J. H. (1992). *Adaptation in natural and artificial systems: An introductory analysis with applications to biology, control, and artificial intelligence* (2nd ed.). MIT Press.

Holota, O. (2019). Approaches to the establishment and management of the defence procurement (acquisition) system: The example of the USA Department of Defense

and the UK Ministry of Defence. *Social Development & Security*, *9*(5), 28-57. https://doi.org/10.33445/sds.2019.9.5.3

House of Commons Defence Committee. (2015). *Decision-making in defence policy: Eleventh report of session 2014–15 (HC 682)*. The Stationery Office. https://publications.parliament.uk/pa/cm201415/cmselect/cmdfence/682/682.pdf

House of Commons Defence Committee. (2022). *The Integrated Review, Defence in a competitive age and the Defence and Security Industrial Strategy: Second report of session 2022–23 (HC 180)*. The Stationery Office. https://committees.parliament.uk/publications/23279/documents/169785/default/

House of Commons Defence Committee. (2023). *It is broke — and it's time to fix it: The UK's defense procurement system: Government response to the Committee's Ninth report of Session 2022–23* (Eighth Special Report of Session 2022–23, HC 1854). UK Parliament. https://committees.parliament.uk/publications/41508/documents/207606/default/

Huntington, S. P. (1967). *The soldier and the state: The theory and politics of civil-military relations* (4th printing). Harvard University Press. (Original work published 1957).

Huss, O., & Musiiaka, S. (2022, May 2). *Accomplishing the impossible: How Ukraine advanced anti-corruption reforms in defense & security*. Corruption, Justice & Legitimacy. https://www.corruptionjusticeandlegitimacy.org/post/accomplishing-the-impossible-how-ukraine-advanced-anti-corruption-reforms-in-defense-security

Huss, W. R., & Honton, E. J. (1987). Scenario planning—What style should you use? *Long Range Planning*, *20*(4), 21–29. https://doi.org/10.1016/0024-6301(87)90152-X

Independent Defence Anti-Corruption Committee (NAKO). (2025, April 30). NAKO analyzes state rear operator procurement and identifies key corruption risks. *NAKO*. https://www.nako.org.ua/en/news/nako-proanalizuvala-korupciini-riziki-zakupivel-derzavnogo-operatora-tilu

Industry Canada. (2014, Summer). *Canadian industrial participation in the F-35 Joint Strike Fighter Program* (Cat. No. Iu42-2/2014-1E PDF) [Government report]. Government of Canada. https://publications.gc.ca/collections/collection_2014/ic/Iu42-2-2014-1-eng.pdf

Innovair. (n.d.). *National Aeronautics Research Programme (NFFP)*. https://innovair.org/en/innovation/national-aeronautics-innovation/nffp/

Innovation, Science and Economic Development Canada. (n.d.). *Canadian industrial participation in the F-35 Joint Strike Fighter Program* [Government report]. https://ised-isde.canada.ca/site/aerospace-defence/en/resources/canadian-industrial-participation-f-35-joint-strike-fighter-program

Ivančić, V. (2013). The biggest failures in managing strategy implementation. *Interdisciplinary Management Research, 9*. https://ssrn.com/abstract=2746528

Ivanova, V., & Rudolph, J. (2025, January 24). Ukraine's Defense Ministry needs protection—From itself. *German Marshall Fund of the United States*. https://www.gmfus.org/news/ukraines-defense-ministry-needs-protection-itself

Janis, I. L. (1982.) Groupthink: Psychological studies of policy decisions and fiascoes (2nd Edn). Boston: Houghton Mifflin.

Jackson, T. (2025, May 10). *Think Tank: It's time for Canada to get serious about defence spending*. The Hub. https://thehub.ca/2025/05/10/think-tank-its-time-for-canada-to-get-serious-about-defence-spending/

Jiménez, A., Hanoteau, J., & Barkemeyer, R. (2022). E-procurement and firm corruption to secure public contracts: The moderating role of governance institutions and supranational support. *Journal of Business Research*, *149*, 640–650. https://doi.org/10.1016/j.jbusres.2022.05.070

Johansen, I. (2018). Scenario modelling with morphological analysis. *Technological Forecasting and Social Change*, *126*, 116–125. https://doi.org/10.1016/j.techfore.2017.05.016

Joint Chiefs of Staff. (2021, October 30). *Charter of the Joint Requirements Oversight Council and implementation of the Joint Capabilities Integration and Development System (CJCSI 5123.01I)*. Joint Staff. https://www.jcs.mil/Portals/36/Documents/Library/Instructions/CJCSI%205123.01I.pdf

Joint Chiefs of Staff. (2021, December 30). *CJCSI 3150.25H: Joint Lessons Learned Program*. US DoD. https://www.jcs.mil/Portals/36/Documents/Doctrine/jlld/cjcsi3150_25h.pdf?ver=IDfjCK6dZDxVnjgNj0Ow3g%3D%3D

Joint Chiefs of Staff. (2023, February 10). *Joint concept for competing*. https://s3.documentcloud.org/documents/23698400/20230213-joint-concept-for-competing-signed.pdf

Joint Chiefs of Staff. (n.d.). *Joint lessons learned*. U.S. DoD. https://www.jcs.mil/Doctrine/Joint-Lessons-Learned/

Joint Expeditionary Force. (n.d.). *JEF operating models*. Retrieved February 28, 2025, from https://jefnations.org/jef-activities/jef-operating-models/

Joó, R. (1996). *The democratic control of armed forces: The experience of Hungary*. Chaillot Papers, (23). European Union Institute for Security Studies. https://www.iss.europa.eu/sites/default/files/EUISSFiles/cp023e.pdf

Kahn, L. (2023, September 20). *Scaling the future: How Replicator aims to fast-track U.S. defense capabilities*. War on the Rocks. https://warontherocks.com/2023/09/scaling-the-future-how-replicator-aims-to-fast-track-u-s-defense-capabilities/

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–291. https://doi.org/10.2307/1914185

Kallany, M. T. (2022). *Corruption and public expenditure: Does corruption divert public spending from social to military sector?* (Master's thesis, Uppsala University, Department of Peace and Conflict Research). Advisor: S. Hatz. DiVA Portal. https://www.diva-portal.org/smash/get/diva2:1676184/FULLTEXT01.pdf

Kancs, d'A. (2022). *Enhancing resilience: Model-based simulations*. EERI Research Paper Series No. 10/2022. Economics and Econometrics Research Institute (EERI), Brussels. https://www.econstor.eu/bitstream/10419/273054/1/1822736951.pdf

Kaptein, M. (2019). The moral entrepreneur: A new component of ethical leadership. *Journal of Business Ethics, 156*, 1135–1150. https://doi.org/10.1007/s10551-017-3641-0

Karttunen, E., Pesu, J., & Immonen, M. (2025). Cross-disciplinary perspectives on problem-based learning approach in public procurement in the European Union. *Journal of Purchasing and Supply Management, 31*(2), 100992. https://doi.org/10.1016/j.pursup.2025.100992

Kaplan, S., & Garrick, B. J. (1981). On the quantitative definition of risk. *Risk Analysis*, *1*(1), 11–27. https://doi.org/10.1111/j.1539-6924.1981.tb01350.x

Kaplan, R. S., & Mikes, A. (2012). Managing risks: A new framework. *Harvard Business Review.* https://www.ferma.eu/app/uploads/2013/03/hbr-managing-risks-a-new-framework.pdf

Keenan, J. M., Trump, B., Kytömaa, E., Adlakha-Hutcheon, G., & Linkov, I. (2024). The role of science in resilience planning for military-civilian domains in the U.S. and

NATO. *Defence Studies, 24*(4), 493–524. https://doi.org/10.1080/14702436.2024.2365218

Keene, S. D. (2018). *Corruption, legitimacy, and stability: Implications for the U.S. Army* (Research Report No. AD1058512). Strategic Studies Institute, U.S. Army War College. https://apps.dtic.mil/sti/pdfs/AD1058512.pdf

Kennedy, P. (1988). *The rise and fall of great powers: Economic change and military conflict from 1500 to 2000*. Unwin Hyman.

Kenwick, M. (2020). Self-reinforcing civilian control: A measurement-based analysis of civil-military relations. *International Studies Quarterly, 64*, 71–84. https://doi.org/10.1093/isq/sqz092

Keppel, M. (2022). Political control and parliamentary committees of inquiry: Strengthening the quality of democracy. *Journal of the Knowledge Economy*. Advance online publication. https://doi.org/10.1007/s13132-021-00883-x

Keupp, M. M. (2021). *Defense economics: An institutional perspective*. Springer. https://doi.org/10.1007/978-3-030-73815-0

Klein, G. (1999). *Sources of Power: How People Make Decisions*. Cambridge: MIT Press.

Knesset. (2001). *Basic Law: The Government* (Unofficial English translation, including amendments through August 15, 2023). Translated by S. H. Rolef. Retrieved June 14, 2025, from https://m.knesset.gov.il/EN/activity/documents/BasicLawsPDF/BasicLawTheGovernment.pdf

Knolle, K. (2018, February 15). Austria to review decision to scrap Eurofighter jets early. *Reuters*. https://www.reuters.com/article/world/austria-to-review-decision-to-scrap-eurofighter-jets-early-idUSKCN1FZ0WY/

Kobs, D. E. (2011). *"AirSea Battle": Can the Air Force and the Navy get along?* School of Advanced Air and Space Studies, Air University. https://apps.dtic.mil/sti/tr/pdf/AD1019372.pdf

Kohler, J., & Dimancesco, D. (2020). The risk of corruption in public pharmaceutical procurement: How anti-corruption, transparency and accountability measures may reduce this risk. *Global Health Action*, *13*(1), 1694745. https://doi.org/10.1080/16549716.2019.1694745

Kourti, I. (2021). Managing the identity paradox in inter-organisational collaborations. *European Management Review, 19*(3), 305–319. https://doi.org/10.1111/emre.12485

Králiková, M. (2021). Importing EU norms: The case of anti-corruption reform in Ukraine. *Journal of European Integration*, *43*(2), 245–260. https://doi.org/10.1080/07036337.2021.1872559

Kravtsov, S., Orobets, K., Shyshpanova, N., Vovchenko, O., & Berezovska-Chmil, O. (2024). Progress and challenges in combating corruption in Ukraine: Pathways forward. *Journal of Strategic Security*, *17*(2), 28–43. https://doi.org/10.5038/1944-0472.17.2.2223

Krepinevich, A. F. (2023). *The origins of victory: How disruptive military innovation determines the fates of great powers*. Yale University Press.

Kundu, O. (2019). Risks in defence procurement: India in the 21st century. *Defence and Peace Economics, 32*(3), 343–361. https://doi.org/10.1080/10242694.2019.1646443

Kuppers, M. (2025, May 5). *European sovereign funds turning to defence and dual-use technology big time*. Building Defence Invest. https://www.linkedin.com/pulse/european-sovereign-funds-turning-defence-dual-use-big-matt-kuppers-cowxe/

Lagassé, P., & Saideman, S. (2019). When civilian control is civil: Parliamentary oversight of the military in Belgium and New Zealand. *European Journal of International Security, 4*(1), 20–41. https://doi.org/10.1017/eis.2018.17

Lawrence, C. (2024, December 2). *Polish startups set to benefit from new €100M Defence Fund*. Tech.eu. https://tech.eu/2024/12/02/poland-takes-a-step-towards-eur100m-defence-fund-a-step-towards-technological-sovereignty/

Lee, S., Kim, M., Hwang, S., Kim, D., & Lee, K. (2025). *Amplifying minority voices: AI-mediated devil's advocate system for inclusive group decision-making*. In *CHI '25: Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems* (Article No. 456, pp. 1–14). ACM. https://doi.org/10.1145/3708557.3716334

Levinas, E. (1980). *Totalidade e infinito*. Edições 70.

Li, N. (2016). Xi Jinping and the People's Liberation Army restructuring. *East Asian Policy, 8*(4), 24–37. https://doi.org/10.1142/S1793930516000374

Li, N., Huang, J., Feng, Y., Huang, K., & Cheng, G. (2020). A review of naturalistic decision-making and its applications to the future military. *IEEE Access, 8*, 38276–38284. https://doi.org/10.1109/ACCESS.2020.2974317

Liang, X., Liang, Y., Kang, W., & Wei, H. (2024). Research on military-civilian collaborative innovation of science and technology based on a stochastic differential game model. *PLOS ONE, 19*. https://doi.org/10.1371/journal.pone.0292635

Libel, T. (2025). The impact of artificial intelligence on the officer corps. Defence Studies. https://doi.org/10.1080/14702436.2025.2466654

Liotta, P. H., & Lloyd, R. M. (2005). From here to there: The strategy and force planning framework. *Naval War College Review, 58*(2), Article 7. https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=2207&context=nwc-review

Ljunggren, D. (2025, August 7). *Exclusive: Canada defense review makes case for sticking with F-35 jets, sources say*. Reuters. https://www.reuters.com/business/aerospace-defense/canada-defense-review-makes-case-sticking-with-f-35-jets-sources-say-2025-08-07/

Locher, J. R. III. (2002). *Victory on the Potomac: The Goldwater-Nichols Act unifies the Pentagon*. Texas A&M University Press.

Lopes da Silva, D. (2023). Political accountability and military spending. *Defence and Peace Economics, 34*(5), 563–580. https://doi.org/10.1080/10242694.2022.2129128

Lovelace, D. C., Jr., & Young, T.-D. (1997). *Joint doctrine development: Overcoming a legacy.* National Defense University, Institute for National Strategic Studies. https://apps.dtic.mil/sti/tr/pdf/ADA528852.pdf

Loveridge, D. (2009). *Foresight: The art and science of anticipating the future.* New York, NY: Routledge.

Lyle, D. "Sugar." (2019, August 5). *Overcoming "the silo effect" in the Department of Defense.* Strategic Multilayer Assessment (SMA) Invited Perspective Series, Future of Great Power Competition & Conflict Effort. S. Canna (Ed.), NSI Inc. https://nsiteam.com/social/wp-content/uploads/2019/08/Lyle-IP-2Aug19-Final2R.pdf

MacDougall, C., & Baum, F. (1997). The devil's advocate: A strategy to avoid groupthink and stimulate discussion in focus groups. *Qualitative Health Research, 7*(4), 532–541. https://doi.org/10.1177/104973239700700407

MacMillan, I. (2018). *Falling short: Suboptimal outcomes in Canadian defence procurement* (Doctoral thesis, University of Calgary). University of Calgary PRISM Repository. https://doi.org/10.11575/PRISM/33132

Mader, G. (2022, November 4). Austrian airpower: Neglect and ignorance to be reversed? *European Security & Defence*. https://euro-sd.com/2022/11/news/26809/austrian-airpower-neglect-and-ignorance-to-be-reversed/

Mader, G. (2024, October 30). Austria's fighter dilemma. *European Security & Defence*. https://euro-sd.com/2024/10/articles/41124/austrias-fighter-dilemma/

Maesschalck, J., & Van de Walle, S. (2006). Policy failure and corruption in Belgium: Is federalism to blame? *West European Politics, 29*(5), 999–1017. https://doi.org/10.1080/01402380600968877

Magruk, A. (2011). Innovative classification of technology foresight methods. *Technological and Economic Development of Economy*, *17*(4), 700-715. https://doi.org/10.3846/20294913.2011.649912

Mahoney, J., & Goertz, G. (2006). A tale of two cultures: Contrasting quantitative and qualitative research. *Political Analysis, 14*(3), 227–249. https://doi.org/10.1093/pan/mpj017

Maitland, E., & Sammartino, A. (2015). Decision making and uncertainty: The role of heuristics and experience in assessing a politically hazardous environment. *Strategic Management Journal, 36*(10), 1554–1578. https://doi.org/10.1002/smj.2297

Mansouri, M., McGrath, M., Schlomer, D., Verma, D., & Anton, P. S. (2022, June). *Joint Capabilities Integration and Development System*. Acquisition Innovation Research Center (AIRC), Stevens Institute of Technology. https://apps.dtic.mil/sti/pdfs/AD1180239.pdf

Mara, P., & Narvekar, D. (2022, November 8). *Anti-bribery and corruption in defence procurement: Risks and mitigation measures*. BTG Legal. Updated July 4, 2023. https://www.btgadvaya.com/post/anti-bribery-and-corruption-in-defence-procurement-risks-and-mitigation-measures

Marchal, B., van Belle, S., van Olmen, J., Hoerée, T., & Kegels, G. (2012). Is realist evaluation keeping its promise? A review of published empirical studies in the field of health systems research. *Evaluation*, 18(2), 192–212. https://doi.org/10.1177/1356389012442444

Marchau, V. A. W. J., Walker, W. E., Bloemen, P. J. T. M., & Popper, S. W. (Eds.). (2019). *Decision making under deep uncertainty: From theory to practice*. Springer. https://library.oapen.org/handle/20.500.12657/22900

Martinez, S., & Galvin, T. (2019). The competitive environment. In T. Galvin & D. Watson (Eds.), *Strategic leadership: Primer for senior leaders* (4th ed., pp. 1-11). US Army War College.

Martins, J. S. (2019). Para lá do Rovuma mandam os que lá estão: Ou o desastre militar em Moçambique durante a primeira guerra mundial de 14-18. In *A Primeira Guerra Mundial. Na Batalha de La Lys* (pp. 185-189). https://bdigital.ufp.pt/bitstream/10284/7755/1/eBook_A%20Primeira%20Guerra%20Mundial.%20Na%20Batalha%20de%20La%20Lys.pdf

Mauro, M. F. (2018). *EU defence: The White Book implementation process.* https://doi.org/10.2861/146500

McKale, S. (2024, November 8). *Harnessing data: Revolutionising defence technology in the UK*. techUK. https://www.techuk.org/resource/harnessing-data-revolutionising-defence-technology-in-the-uk.html

Meadows, D. H., & Wright, D. (2009). Thinking in systems: A primer (D. Wright, Ed.). Sustainability Institute. (Original work published 2008)

Meritorious Service Medal (Belgium). (n.d.). *Military History Wiki*. Retrieved August 13, 2025, from https://military-history.fandom.com/wiki/Meritorious_Service_Medal_(Belgium)

Migone, A., Howlett, A., & Howlett, M. (2023). *Procurement and politics: Strategies of defence acquisition in Canada and Australia*. Springer. https://doi.org/10.1007/978-3-031-25689-9

Mik, T. (2024). Corruption in defense procurement: Key threats and mechanisms to overcome them to ensure the national security of Ukraine. *Efficiency of Public Administration*. https://doi.org/10.36930/507811

Miles, I. (2002). *Appraisal of alternative methods and procedures for producing regional foresight* (Second draft). https://pt.scribd.com/document/36405036/Appraisal-of-Alternative-Methods-for-Foresight

Miles, I., & Keenan, M. (Eds.). (2002). *Practical guide to regional foresight in the United Kingdom*. European Commission. EUR 20478. https://www.academia.edu/4126002/Practical_Guide_to_Regional_Foresight

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications.

Miller, B. (2019). *Naval agility: Critical initiatives.* Guidehouse. https://guidehouse.com/-/media/www/site/insights/defense/2020/gh-075c_wp-naval-agility.pdf

Milton, L. (2015). Leadership excellence in interdependent contexts: Self-validation and identity confirmation as antecedents to and co-requisites of leader effectiveness—Through and beyond behavioural integrity. *The Journal of Character & Leadership Integration,* *3*(1), 32–43. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2618801

Milutinović, M. S., & Lekić, S. (2017). *Lessons learned from engagement in NATO's Building Integrity (BI) Programme*. In Building Integrity and Reducing Corruption in Defence and Security Sector: A Compendium of Best Practices Volume II (pp. 169–182). NATO and Geneva Centre for the Democratic Control of Armed Forces (DCAF). https://www.isi.mod.gov.rs/multimedia/dodaci/2017_lesson_learned_from_nato_s_bi_programme_1694160105.pdf

Ministry of Defence, United Kingdom. (2015, August). *Future operating environment 2035* [Government report]. https://assets.publishing.service.gov.uk/media/6286575de90e071f69f22600/FOE.pdf

Ministry of Defence, United Kingdom. (2018, October 2). *Global Strategic Trends: The Future Starts Today* (6th ed.) [Government report]. https://assets.publishing.service.gov.uk/media/66f6d04cc71e42688b65ee14/GST_the_future_starts_today_ARCHIVE.pdf

Ministry of Defence, United Kingdom. (2021, January 27). *The orchestration of military strategic effects* [Government report]. https://assets.publishing.service.gov.uk/media/60521238d3bf7f04591df707/20210316-OMSE_new_web-O.pdf

Ministry of Defence, United Kingdom. (2022, November 3). *Joint Doctrine Publication 0-01, UK Defence Doctrine (6th ed.)* [Government doctrine]. https://assets.publishing.service.gov.uk/media/63776f4de90e0728553b568b/UK_Defence_Doctrine_Ed6.pdf

Ministry of Defence, United Kingdom. (2024, September 27). *Global Strategic Trends: Out to 2055* (7th ed.) [Government report]. https://assets.publishing.service.gov.uk/media/673602412469c5b71dbc7b6f/Global_Strategic_Trends_Out_to_2055.pdf

Ministry of Defence, United Kingdom. (2025, February 18). *Defence Secretary's speech on defence reform* [Speech]. GOV.UK. https://www.gov.uk/government/speeches/defence-secretarys-speech-on-defence-reform--2

Ministry of Defence, United Kingdom. (n.d.). *Ministry of Defence Research Ethics Committee (MODREC)*. GOV.UK. https://www.gov.uk/government/groups/ministry-of-defence-research-ethics-committees

Ministry of Defence of Ukraine. (2025, June 10). *DPA and DOT presented the functionality of the future DOT-Chain Defence weapons marketplace to the military*. https://mod.gov.ua/en/news/dpa-and-dot-presented-the-functionality-of-the-future-dot-chain-defence-weapons-marketplace-to-the-military

Mintzberg, H. (1994). *The rise and fall of strategic planning: Reconceiving roles for planning, plans, planners*. Free Press.

Minow, M. L. (2005). Outsourcing power: How privatizing military efforts challenges accountability, professionalism, and democracy. *Boston College Law Review, 46*(5), 989–1026. https://dash.harvard.edu/handle/1/12933376

Molnár, T. L. (2020). The security perception and security policy of Austria, 1989–2017. *Defense & Security Analysis*, *37*(1), 66–79. https://doi.org/10.1080/14751798.2020.1831234

Moore, D. W., & Trout, B. T. (1978). Military advancement: The visibility theory of promotion. *The American Political Science Review, 72*(2), 452–468. https://doi.org/10.2307/1954104

Morton, J., Stacey, P., & Mohn, M. (2018). Building and maintaining strategic agility: An agenda and framework for executive IT leaders. *California Management Review, 61*(1), 94–113.

Moteka, R. (2023). The Joint Warfare Centre's 360º MDS: Scenario design and development. *The Three Swords, 39,* 76–78. https://www.jwc.nato.int/newsroom/three-swords/#flipbook-df_10882/1/

Mukherjee, A., & Pion-Berlin, D. (2022). The fulcrum of democratic civilian control: Re-imagining the role of defence ministries. *Journal of Strategic Studies, 45*(6–7), 783–797. https://doi.org/10.1080/01402390.2022.2127094

Mukumbang, F. C., Marchal, B., Van Belle, S., & van Wyk, B. (2020). Using the realist interview approach to maintain theoretical awareness in realist studies. *Qualitative Research, 20*(4), 485–512. https://doi.org/10.1177/1468794119881985

National Defense University Press. (n.d.). *About NDU Press*. https://ndupress.ndu.edu/About/

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science, 5*(1), 14–37. https://doi.org/10.1287/orsc.5.1.14

North Atlantic Treaty Organization (NATO). (2020, November 25). *NATO 2030: United for a new era: Analysis and recommendations of the reflection group appointed by the NATO Secretary General.* https://www.nato.int/nato_static_fl2014/assets/pdf/2020/12/pdf/201201-reflection-group-final-report-uni.pdf

North Atlantic Treaty Organization. (2021, June). *NATO 2030 factsheet*. https://www.nato.int/nato_static_fl2014/assets/pdf/2021/6/pdf/2106-factsheet-nato2030-en.pdf

North Atlantic Treaty Organization. (2022, June 29). *NATO Strategic Concept: Adopted by Heads of State and Government at the NATO Summit in Madrid*. https://www.act.nato.int/wp-content/uploads/2023/05/290622-strategic-concept.pdf

North Atlantic Treaty Organization. (2023, July 27). *NATO exercises*. https://www.nato.int/cps/en/natohq/topics_49285.htm

North Atlantic Treaty Organization. (2024a). *Leadership and Ethics Reference Curriculum*. https://www.nato.int/nato_static_fl2014/assets/pdf/2024/7/pdf/240719-deep-leadership-ethics-curr.pdf

North Atlantic Treaty Organization. (2024b). *Summary of NATO's revised Artificial Intelligence (AI) strategy*. https://www.nato.int/cps/en/natohq/official_texts_227237.htm

North Atlantic Treaty Organization. (2024, October 17). NATO launches five new multinational cooperation initiatives that enhance deterrence and defence. *NATO Headquarters*. https://www.nato.int/cps/en/natohq/news_229664.htm?selectedLocale=en

North Atlantic Treaty Organization. (2025). *Opinion: NATO Secretary General comments on security situation in Poland*. https://www.nato.int/cps/en/natohq/opinions_237596.htm

North Atlantic Treaty Organization. (2025, January 22). *Building Integrity*. NATO. https://www.nato.int/cps/en/natohq/topics_68368.htm

North Atlantic Treaty Organization. (2025, February 14). *Performance audit reports: International Board of Auditors for NATO (IBAN)*. https://www.nato.int/cps/en/natohq/topics_111783.htm

North Atlantic Treaty Organization. (n.d.-a). *Operations Capabilities Concept - Evaluation and Feedback Programme*. Retrieved February 20, 2025, from https://lc.nato.int/operations/military-partnership/the-partnership-for-peace/occ-ef

North Atlantic Treaty Organization. (n.d.-b). *Crisis Management and Disaster Response Centre of Excellence (CMDR COE)*. NATO. Retrieved February 22, 2025, from https://cmdrcoe.org/

North Atlantic Treaty Organization. (n.d.-c). *Defense Innovation Accelerator for the North Atlantic (DIANA)*. https://www.diana.nato.int/

North Atlantic Treaty Organization. Allied Air Command**.** (2025, May 29). *Allies strengthen operational integration during exercise Steadfast Deterrence 2025*. https://ac.nato.int/archive/2025-2/allies-strengthen-operational-integration-during-exercise-steadfast-deterrence-2025

North Atlantic Treaty Organization Allied Command Transformation (ACT). (2016, April 19–20). *Strategic foresight analysis workshop – I: Outbrief panel session*. Strategic Analysis BH, Strategic Plans and Policy. https://www.act.nato.int/wp-content/uploads/2023/05/sfa-ffao-ws-20160419.pdf

North Atlantic Treaty Organization Allied Command Transformation. (2017). *Strategic foresight analysis 2017 report*. https://www.act.nato.int/wp-content/uploads/2023/06/171004_sfa_2017_report_hr-3.pdf

North Atlantic Treaty Organization Allied Command Transformation. (2018). *Framework for future alliance operations*. Norfolk, Virginia: NATO.

North Atlantic Treaty Organization Allied Command Transformation. (2021). *Regional perspectives report on Russia: Strategic foresight analysis*. https://www.act.nato.int/wp-content/uploads/2023/05/regional-perspectives-2021-01.pdf

North Atlantic Treaty Organization Allied Command Transformation. (2023, December 22). *Adaptable strategy: NATO Warfighting Capstone Concept's 20-year vision for NATO and Allied forces*. https://www.act.nato.int/article/nwccs-20year-vision-for-nato/

North Atlantic Treaty Organization Allied Command Transformation. (n.d.-a). *Allied Command Transformation Strategic Foresight Work*. https://www.act.nato.int/activities/allied-command-transformation-strategic-foresight-work/

North Atlantic Treaty Organization Allied Command Transformation. (n.d.-b). *Federated Mission Networking*. https://www.act.nato.int/activities/federated-mission-networking/

North Atlantic Treaty Organization Allied Command Transformation. (n.d.-c). A commitment to innovation and sustainability within the NATO community. *NATO Innovation Hub*. https://innovationhub-act.org/

North Atlantic Treaty Organization Command and Control Centre of Excellence (C2COE). (2024, September 11). *Cross-domain command concept workshop 5: Orchestration is needed, but what is it?* https://c2coe.org/cross-domain-command-concept-workshop-5-orchestration-is-needed-but-what-is-it

North Atlantic Treaty Organization Communications and Information Agency. (2019). *Allied Joint Doctrine for Operational-Level Planning (AJP-5)*. NATO. https://www.coemed.org/files/stanags/01_AJP/AJP-5_EDA_V2_E_2526.pdf

North Atlantic Treaty Organization Communications and Information Agency. (n.d.). *COI Cooperation Portal*. NATO. https://coi.nato.int/Pages/DNBLHomePage.aspx

North Atlantic Treaty Organization Joint Analysis and Lessons Learned Centre (JALLC). (2023, March 10). *Military Strategic Assessment: Why periodic mission reviews may not be fulfilling the purpose*. https://www.jallc.nato.int/application/files/4916/8146/0379/OPSA_Factsheet_17032023.pdf

North Atlantic Treaty Organization Joint Analysis and Lessons Learned Centre. (n.d.). *Lessons Learned Portal*. https://www.jallc.nato.int/managing-nato-lessons-learned-portal

North Atlantic Treaty Organization Strategic Communications Centre of Excellence. (n.d.). *NATO Strategic Communications Centre of Excellence*. https://stratcomcoe.org/

North Atlantic Treaty Organization Science & Technology Organization (STO). (2014). *Command and control (C2) agility: Task Group SAS-085 final report*. NATO STO.

North Atlantic Treaty Organization Science & Technology Organization. (2018). *Analysis support guide for risk-based strategic planning* (STO-TR-SAS-093-Part-I). https://www.centrostudiesercito.it/doc/NATO_Risk_Based_Strategic_Planning.pdf

North Atlantic Treaty Organization Science & Technology Organization. (2020, March). *Science and technology trends 2020–2040*. https://www.nato.int/nato_static_fl2014/assets/pdf/2020/4/pdf/190422-ST_Tech_Trends_Report_2020-2040.pdf

North Atlantic Treaty Organization Science & Technology Organization. (2022, September). *Leader development for NATO multinational military operations* (STO Technical Report TR-HFM-286). https://www.sto.nato.int/publications/STO%20Technical%20Reports/Forms/All%20Documents.aspx

North Atlantic Treaty Organization Science & Technology Organization. (2024). *Collaborative Programme of Work 2024*. NATO STO. http://www.sto.nato.int

North Atlantic Treaty Organization Science & Technology Organization. (2024, May). *Conceptual framework for comprehensive national defense system (Cadre conceptuel d'un système national de défense complète)* (STO Technical Report TR-SAS-152). [Final report of Task Group SAS-152]. https://www.naa.mil.lv/sites/naa/files/document/NATO_STO_ComprehensiveNationalDefenseSystem_2.pdf

North Atlantic Treaty Organization Support and Procurement Agency. (n.d.). *NATO Support and Procurement Agency (NSPA)*. Retrieved February 16, 2025, from https://www.nspa.nato.int/

O'Brien, P. (2023). *The war that defied expectations: What Ukraine revealed about military power*. *Foreign Affairs*. https://www.foreignaffairs.com/ukraine/war-defied-expectations

Observatory of Public Sector Information. (2021). *Towards a strategic foresight in Ireland*. OECD. https://oecd-opsi.org/wp-content/uploads/2021/05/Strategic-Foresight-in-Ireland.pdf

Ochmanek, D. A., Dowd, A., Flanagan, S. J., Hoehn, A. R., Hornung, J. W., Lostumbo, M. J., & Mazarr, M. J. (2023). *Inflection point: How to reverse the erosion of U.S. and*

allied military power and influence. RAND Corporation. https://www.rand.org/pubs/research_reports/RRA2555-1.html

Office of the Auditor General of Canada. (2012). Chapter 2: Replacing Canada's fighter jets. In *2012 Spring report of the Auditor General of Canada*. Government of Canada. https://publications.gc.ca/collections/collection_2012/bvg-oag/FA1-2012-1-2-eng.pdf

Office of the Commissioner of Lobbying of Canada. (2025). *Annual report 2024–25*. Government of Canada. https://lobbycanada.gc.ca/en/reports-and-publications/annual-report-2024-25/

Office of the Law Revision Counsel. (n.d.). *50 U.S.C. § 3021 – National Security Council*. U.S. Code. U.S. House of Representatives. https://uscode.house.gov/view.xhtml?req=%28title%3A50+section%3A3021+edition%3Aprelim%29

Organisation for Economic Co-operation and Development (OECD). (2019). *Reforming public procurement: Progress in implementing the 2015 OECD recommendation*. OECD Publishing. https://www.oecd.org/en/publications/reforming-public-procurement_1de41738-en.html

Organisation for Economic Co-operation and Development (OECD). (2025). *OECD integrity and anti-corruption review of Ukraine* (OECD Public Governance Reviews). OECD Publishing. https://doi.org/10.1787/7dbe965b-en

Organisation for Economic Co-operation and Development Working Group on Bribery. (2024). *Implementing the OECD Anti-Bribery Convention: Phase 4 report – Austria*. https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/10/implementing-the-oecd-anti-bribery-convention-phase-4-report-austria_b4e5dfe7/07a7d515-en.pdf

Panella, C. (2025, February). *The U.S. military's elite special operators need a lot more 'truly cheap' weapons to fight the next big war, general says* [Interview with Lt. Gen. Dagvin R.M. Anderson]. Business Insider. https://www.businessinsider.com/us-special-operators-need-more-cheap-weapons-for-next-war-2025-2

Paravantis, J. A., Kontoulis, N. V., & Iliadi, I. (2020). A survey of personality trait perceptions in leadership promotions in the Greek Armed Forces. *Journal of Resources Development and Management*, *63*, 33–47. https://doi.org/10.7176/JRDM/63-04

Patton, M. Q. (2002). Qualitative research & evaluation methods: Integrating theory and practice (3rd ed.). Sage.

Pawson, R., & Manzano-Santaella, A. (2012). A realist diagnostic workshop. *Evaluation, 18*(2), 176–191. https://doi.org/10.1177/1356389012440912

Pawson, R., & Tilley, N. (1997). *Realistic evaluation*. SAGE Publications.

Peco-Yeste, M. (2024, July). *How to do strategic foresight* (Insight No. 4/2024). NATO Defence College, Strategy Series. https://www.ndc.nato.int/news/news.php?icode=1960

Peters, B. G. (2019). *Institutional theory in political science: The new institutionalism* (4th ed.). Edward Elgar.

Pierce, T. C. (2004). *Warfighting and disruptive technologies: Disguising innovation*. (C. Gray & W. Murray, Series Eds.). Cass series: Strategy and history. Routledge. Published in the Taylor & Francis e-Library.

Pierson, P. (2000). Increasing returns, path dependence, and the study of politics. *American Political Science Review, 94*(2), 251–267. https://doi.org/10.2307/2586011

Pînzariu, S., Neag, M., & Pînzariu, A. (2024). Enhancing joint training and education in NATO: A comprehensive framework for interoperability and operational effectiveness. *Scientific Bulletin, 29*, 111–117. https://doi.org/10.2478/bsaft-2024-0012

Popper, R. (2011). *Futures*. https://rafaelpopper.wordpress.com/futures/

Popper, R. (2018). *Foresight process and fundamentals*. https://prospectivaalc.org/wp-content/uploads/2018/05/p3_4_t3_foresight-process.pdf

Porter, M. E. (1998). *Competitive strategy: Techniques for analyzing industries and competitors*. With a new introduction. The Free Press.

Postma, T. J. B. M., & Liebl, F. (2005). How to improve scenario analysis as a strategic management tool. *Technological Forecasting and Social Change, 72*(2), 161–173.

Prakasa, S. U. W., Asis, A., & Sahid, M. M. (2022). Reduce corruption in public procurement: The effort towards good governance. *Bestuur, 10*(1), 33–42. https://doi.org/10.20961/bestuur.v10i1.51339

Prime Minister's Office & Ministry of Defence. (2025, February 25). *Prime Minister sets out biggest sustained increase in defence spending since the Cold War, protecting British people in new era for national security* [Press release]. GOV.UK. https://www.gov.uk/government/news/prime-minister-sets-out-biggest-sustained-

increase-in-defence-spending-since-the-cold-war-protecting-british-people-in-new-era-for-national-security

Przeworski, A., & Teune, H. (1970). *The Logic of Comparative Social Inquiry*. John Wiley & Sons.

Pyman, M. (2017). Addressing corruption in military institutions. *Public Integrity*, *19*(6), 513–528. https://doi.org/10.1080/10999922.2017.1285267

Ramírez, R., & van der Heijden, K. (2007). Scenarios to develop strategic options: A new interactive role for scenarios in strategy. In B. Sharpe & K. van der Heijden (Eds.), *Scenarios for success: Turning insights into action* (pp. 89–119). John Wiley & Sons.

Randolph, B. W., Jr., & Nisbett, K. (2019). Mentoring leaders across race and gender lines: Insight from US Army officers. *Journal of Organizational Effectiveness: People and Performance*, *6*(2), 97–112. https://doi.org/10.1002/joe.21931

Rast, D. E., III, Hogg, M. A., & van Knippenberg, D. (2018). Intergroup leadership across distinct subgroups and identities. *Personality and Social Psychology Bulletin, 44*(7), 1090–1103. https://doi.org/10.1177/0146167218757457

Rawal, S. (2022). Understanding civil-military relations for better civilian control of the military in Nepal. *Nepal Public Policy Review, 2*. https://doi.org/10.3126/nppr.v2i1.48399

RECOBIA Consortium. (2015). *REduction of COgnitive BIAses in Intelligence Analysis: Final report summary*. European Commission. https://cordis.europa.eu/project/id/285010/reporting

Rendon, J., & Rendon, R. (2016). Procurement fraud in the US Department of Defense: Implications for contracting processes and internal controls. *Managerial Auditing Journal, 31*(6/7), 748–767. https://doi.org/10.1108/MAJ-11-2015-1267

Reykers, Y. (2021). Strengthening parliamentary oversight of defense procurement: Lessons from Belgium. *European Security, 30*(4), 505–525. https://doi.org/10.1080/09662839.2021.1886087

Reykers, Y., & Fonck, D. (2020). No wings attached? Civil–military relations and agent intrusion in the procurement of fighter jets. Cooperation and Conflict, 55, 66–85. https://doi.org/10.1177/0010836719850203

Richter, M. M. (2023). ‘Call the bluff’ or ‘build back better’—Anti-corruption reforms in post-war Ukraine. *Global Policy*. Advance online publication. https://doi.org/10.1111/1758-5899.13251

Robinson, M. A., & Morrison, R. L. (2009). *Collaboration technology in military operations: Lessons learned from the corporate domain. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 53*(12), 793–797. https://www.researchgate.net/publication/235164368_Collaboration_Technology_in_Military_Operations_Lessons_Learned_from_the_Corporate_Domain

Rogerson, W. (1994). Economic incentives and the defense procurement process. *Journal of Economic Perspectives, 8*(4), 65–90. https://doi.org/10.1257/jep.8.4.65

Rogulis, D. (2025). Understanding Lithuania's total defense approach in the face of Russian threat through principal–agent theory. *Security and Defense Quarterly, 49*(1), 58–73. https://doi.org/10.35467/sdq/195805

Roud, E. (2021). Collective improvization in emergency response. *Safety Science, 135*, 105104. https://doi.org/10.1016/j.ssci.2020.105104

Rovner, J. (2024). History is written by the losers: Strategy and grand strategy in the aftermath of war. *Journal of Strategic Studies*. Advance online publication. https://doi.org/10.1080/01402390.2024.2321604

Rühle, M., & Roberts, C. (2021, March 19). Enlarging NATO's toolbox to counter hybrid threats. *NATO Review*. https://www.nato.int/docu/review/articles/2021/03/19/enlarging-natos-toolbox-to-counter-hybrid-threats/index.html

Saldaña, J. (2009). *The coding manual for qualitative researchers*. Sage.

Santos, J. A. L. (2000). *Reflexões sobre estratégia: Temas de segurança e defesa*. Publicações Europa-América.

Saxi, H. L. (2017). British and German initiatives for defense cooperation: The Joint Expeditionary Force and the Framework Nations Concept. *Defense Studies, 17*(2), 171–197. https://doi.org/10.1080/14702436.2017.1307690

Schaefer, A. G., Winkler, J. D., Jackson, K., Ibarra, D., Jones, D. D., & McGovern, G. (2020). *Approaches for strengthening Total Force culture and facilitating cross-component integration in the U.S. military* (RAND Report RR-2143). RAND Corporation. https://www.rand.org/content/dam/rand/pubs/research_reports/RR2100/RR2143/RAND_RR2143.pdf

Schlueter, M., Giesener, M., Mayer, L., Key, L., & Hassan, M. (2025). *Overcoming the six unspoken barriers that impede defense innovation* (Fourth annual edition). The

Defense Innovation Readiness Gap Series. Boston Consulting Group. https://web-assets.bcg.com/c0/ad/ed8e25f5483aa1f42a614c0224bf/overcoming-the-six-unspoken-barriers-that-impede-defense-innovation-msc.pdf

Schoemaker, P. J. H. (1995). Scenario Planning: A Tool for Strategic Thinking. *Sloan Management Review, 36*(2), 25–40.

Schwartz, P. (1991). *The art of the long view: Planning for the future in an uncertain world.* Doubleday.

Scollick, A. (2020). *A strategic adaptive defence planning framework for state polities in the 21st century.* https://andyscollick.wordpress.com/wp-content/uploads/2021/10/a-strategic-adaptive-defence-planning-framework-for-state-polities-in-the-21st-century.pdf

Seawright, J., & Gerring, J. (2008). Case selection techniques in case study research: A menu of qualitative and quantitative options. *Political Research Quarterly, 61*(2), 294–308. https://doi.org/10.1177/1065912907313077

Selviaridis, K., Hughes, A., & Spring, M. (2023). Facilitating public procurement of innovation in the UK defence and health sectors: Innovation intermediaries as institutional entrepreneurs. *Research Policy, 52*(1), 104673. https://doi.org/10.1016/j.respol.2022.104673

Sempere, C. M. (2023). The problem of allocating resources to defense. *Defence Studies*, 23(1), 86–104. https://doi.org/10.1080/14702436.2022.2094251

Senge, P. M. (2006). *The fifth discipline: The art and practice of the learning organization* (2nd ed.). Crown Business.

Shea, J. (2016). Resilience: A core element of collective defense. *NATO Review*. https://www.nato.int/docu/review/articles/2016/03/30/resilience-a-core-element-of-collective-defence/index.html

Shulhan, I. (2024). On the preconditions of corruption during the full-scale war in Ukraine. *Bulletin of Lviv Polytechnic National University. Series: Legal Sciences*, *11*(1[41]), 400–406. https://doi.org/10.23939/law2024.41.400

Šimanauskienė, V., Giedraitytė, V., & Navickienė, O. (2021). The role of military leadership in shaping innovative personnel behaviour: The case of the Lithuanian Armed Forces. *Sustainability, 13*(16), 9283. https://doi.org/10.3390/su13169283

Simon, H. A. (1997). *Administrative behavior: A study of decision-making processes in administrative organizations* (4th ed.). Free Press.

Snider, D. M. (1996). *The U.S. military in transition to jointness: Surmounting old notions of interservice rivalry.* Strategic Studies Institute, U.S. Army War College. https://apps.dtic.mil/sti/tr/pdf/ADA529837.pdf

Snowden, D. J., & Boone, M. E. (2007). A leader's framework for decision making. *Harvard Business Review*, November. https://hbr.org/2007/11/a-leaders-framework-for-decision-making.

StateWatch. (2024, August 2). *Dominance of certain suppliers in the procurement of tactical equipment for the Armed Forces of Ukraine* [Policy brief]. Retrieved August 19, 2025, from https://statewatch.org.ua/en/publications/dominuvannia-okremykh-postachalnykiv-na-zakupivliakh-rechovoho-zabezpechennia-dlia-zsu/

Störmer, E., Bontoux, L., Krzysztofowicz, M., Florescu, E., Bock, A.-K., & Scapolo, F. (2020). Foresight – using science and evidence to anticipate and shape the future. In V. Šucha & M. Sienkiewicz (Eds.), Science for policy handbook (pp. 128–142). Elsevier. https://doi.org/10.1016/B978-0-12-822596-7.00012-7

Strachan, H. (2013). *The direction of war: Contemporary strategy in historical perspective*. Cambridge University Press.

Stanley-Lockman, Z. (2021). From closed to open systems: How the U.S. military services pursue innovation. *Journal of Strategic Studies, 44*, 480–514. https://doi.org/10.1080/01402390.2021.1917393

State Operator for Non-Lethal Acquisition, Defense Procurement Agency, & National Agency on Corruption Prevention. (2025, July 3). *Transparency and security: DOT and DPA, together with the National Agency on Corruption Prevention, presented anti-corruption infrastructure in line with NATO recommendations*. https://dotua.org/en/1751531385/

Strategic Command. (n.d.). *Strategic Command: Sharpening Defence's Edge*. GOV.UK. https://www.gov.uk/government/organisations/strategic-command/about

Strik, N. P. (2023). *Knowledge withholding: The development of a framework of antecedents from a relational perspective* [Doctoral thesis, Maastricht University]. Maastricht University. https://doi.org/10.26481/dis.20230131ns

Suardi, I., Rossieta, H., Djakman, C., & Diyanty, V. (2024). Procurement governance in reducing corruption in the Indonesian public sector: A mixed method approach. *Cogent Business & Management*, *11*(1), 2393744. https://doi.org/10.1080/23311975.2024.2393744

Sundqvist, J., & Bynander, F. (2021). *Understanding civil-military interactions in Swedish total defense: Emerging insights and lessons from local and regional levels. Scandinavian Journal of Military Studies, 4*(1), 263–274. https://sjms.nu/articles/10.31374/sjms.288

Support for Improvement in Governance and Management (SIGMA). (2011, September). *Defence procurement* (Brief 23). OECD Publishing. https://www.oecd.org/content/dam/oecd/en/publications/reports/2011/09/defence-procurement_g17a25f1/5js4vmntfz0p-en.pdf

Swanson, K., Drury, J., & Lewis, R. (2004). *A study of collaborative work practices in a joint military setting*. https://www.academia.edu/2210522/A_study_of_collaborative_work_practices_in_a_joint_military_setting

Swedish Civil Contingencies Agency. (n.d.). *About MSB*. Retrieved May 31, 2025, from https://www.msb.se/en/about-msb/

Taleb, N. N. (2007). *The black swan: The impact of the highly improbable*. Random House.

Taleb, N. N. (2012). *Antifragile: Things that gain from disorder*. Random House.

Tavory, I., & Timmermans, S. (2014). *Abductive analysis: Theorizing qualitative research*. University of Chicago Press.

Teague, T., & Braswell, D. E. (2023, March). *Reimagining homeland defense: A need for an integrated approach. Military Review Online Exclusive.* https://www.armyupress.army.mil/Journals/Military-Review/Online-Exclusive/2023-OLE/Teague/

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509–533. https://onlinelibrary.wiley.com/doi/10.1002/(SICI)1097-0266(199708)18:7%3C509::AID-SMJ882%3E3.0.CO;2-Z

Telo, A. J., Borges, P., & Pires, N. L. (2018). *Dar uma razão à força e uma força à razão*. Fronteira do Caos Editores, Lda.

Telo, A. J., & Pires, N. L. (2018). *A Grande Guerra em África: Os que inovam, os que se adaptam e os outros.* Porto: Fronteira do Caos Editores, Lda.

10 U.S.C. (n.d.). *Armed Forces* (Title 10). https://www.law.cornell.edu/uscode/text/10

Terpan, F., & Saurugger, S. (2018). Assessing judicial activism of the CJEU: The case of the court's defence procurement rulings. *Journal of European Integration*, *40*(5), 543–561. https://doi.org/10.1080/07036337.2018.1537268

The Brussels Times. (2025, June 9). *Belgium Defence gets first general for drones and innovation*. *The Brussels Times*. https://www.brusselstimes.com/belgium/1614835/belgium-defence-gets-first-general-for-drones-and-innovation

Transparency International. (2024). *Corruption Perceptions Index 2023*. Transparency International. https://images.transparencycdn.org/images/CPI-2023-Report.pdf

Transparency International Defence & Security. (2021). *GDI 2020 Global report: Disruption, democratic governance, and corruption risk in defence institutions*. Transparency International UK. https://ti-defence.org/gdi/downloads/

Transparency International Defence & Security. (n.d.). *Government Defence Integrity Index – Downloads*. Retrieved August 16, 2025, from https://ti-defence.org/gdi/downloads/

Transparency International Defence & Security, & Independent Defence Anti-Corruption Committee (NAKO). (2018, September 24). *Six red flags: The most frequent corruption risks in Ukraine's defence procurement*. https://ti-defence.org/publications/sixredflags/

TsAMTO. (2021, April 12). *The Canadian Air Force will soon receive another six Australian F/A-18A "Hornet" fighters*. Centre for Analysis of World Arms Trade. https://armstrade.org/includes/periodics/news/2021/0412/103562368/detail.shtml

United States Army Heritage and Education Center. (n.d.). *Who first originated the term VUCA (volatility, uncertainty, complexity and ambiguity)?* USAHEC Find Your Answer. https://usawc.libanswers.com/ahec/faq/84869

United States Department of Defense. (2022, October 27). *2022 National Defense Strategy, Nuclear Posture Review, and Missile Defense Review*. https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-national-defense-strategy-npr-mdr.pdf

United States Department of Defense. (2023, August 23). *Software acquisition pathway integration with risk management framework*. https://dodcio.defense.gov/Portals/0/Documents/Library/SWAPathwayIntegration-RMF.PDF

United States Government Accountability Office. (2025, April). *Defense command and control: Further progress hinges on establishing a comprehensive framework* (GAO-25-106454). https://www.gao.gov/assets/gao-25-106454.pdf

United States House Committee on Foreign Affairs. (n.d.). *Hearings — all* [Web page]. U.S. House of Representatives. Retrieved August 16, 2025, from https://foreignaffairs.house.gov/committee-activity/hearings/all

United States Senate Armed Services Committee. (2024, June). *Fiscal Year 2025 National Defense Authorization Act: Executive summary*. https://www.armed-services.senate.gov/imo/media/doc/fy25_ndaa_executive_summary.pdf

van der Heijden, K. (1996). *Scenarios: The Art of Strategic Conversation*. Chichester: Wiley.

van der Lijn, J. (2015). Comprehensive approaches, diverse coherences: The different levels of policy coherence in the Dutch 3D approach in Afghanistan. *Small Wars & Insurgencies, 26*(1), 72–89. https://doi.org/10.1080/09592318.2014.959773

Vergun, D. (2023, December 13). DOD addresses recruiting shortfall challenges. U.S. Department of Defense. https://www.defense.gov/News/News-Stories/Article/Article/3616786/

Voros, J. (2003). A generic foresight process framework. *Foresight*, 5(3), 10-21. https://doi.org/10.1108/14636680310698379

Walker, W. E., Haasnoot, M., & Kwakkel, J. H. (2013). Adapt or perish: A review of planning approaches for adaptation under deep uncertainty. *Sustainability, 5*(3), 955–979. https://doi.org/10.3390/su5030955

Wang, X., Shi, X., Chen, J., Guo, X., & Li, D. (2024). Exploring optimal pathways for enterprise procurement management systems based on fast neural modeling and semantic segmentation. *Heliyon, 10*(7), e26474. https://doi.org/10.1016/j.heliyon.2024.e26474

Weber, Y., & Tarba, S. Y. (2014). Strategic agility: A state of the art introduction to the special section on strategic agility. *California Management Review, 56*(3), 5–12. https://doi.org/10.1525/cmr.2014.56.3.5

Weiss, M. (2019). From wealth to power? The failure of layered reforms in India's defense sector. *Journal of Global Security Studies, 4*(4), 560–578. https://doi.org/10.1093/jogss/ogz036

Westa, J. S. (1999). *Toward common joint targeting: Synchronizing the battlefield through doctrine?* [Monograph]. School of Advanced Military Studies, U.S. Army Command and General Staff College. https://apps.dtic.mil/sti/tr/pdf/ADA370367.pdf

Whelan, C. (2014). Managing dynamic security networks: Towards the strategic managing of cooperation, coordination, and collaboration. *Security Journal*. Advance online publication. https://doi.org/10.1057/sj.2014.20

Wilkenfeld, J., & Murauskaite, E. E. (2021). *Escalation management in the gray zone: Shaping decision calculus: From theory to causal understanding* (Final Report, December 2021). Minerva Research Initiative. University of Maryland. https://www.start.umd.edu/sites/default/files/publications/local_attachments/Escalation%20Management%20in%20the%20Gray%20Zone.pdf

Wolf, C. (1978). *A Theory of Non-Market Failure: Framework for Implementation Analysis*. Santa Monica, CA: RAND Corporation.

Wolfers, A. (1952). *"National security" as an ambiguous symbol*. *Political Science Quarterly, 67*(4), 481–502. http://links.jstor.org/sici?sici=0032-3195%28195212%2967%3A4%3C481%3A%22SAAAS%3E2.0.CO%3B2-R

Woods, D., Abdallah, M., Bagchi, S., Sundaram, S., & Cason, T. (2021). Network defense and behavioral biases: An experimental study. *Experimental Economics, 25*, 254–286. https://doi.org/10.1007/s10683-021-09714-x

World Peace Foundation. (2020, September 3). *Airbus Eurofighter sales to Austria* (updated August 10, 2023). Corruption Tracker. https://corruption-tracker.org/case/airbus-eurofighter-sales-to-austria

Yanow, D. (2000). *Conducting interpretive policy analysis* (Qualitative Research Methods, Vol. 47). SAGE.

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.

Yukins, C. R., & Kelman, S. H. (2022, July). Overcoming corruption and war—Lessons from Ukraine's ProZorro procurement system. *NCMA Contract Management Magazine*, 22–27. https://scholarship.law.gwu.edu/cgi/viewcontent.cgi?article=2887&context=faculty_publications

Yukl, G. A. (2013). *Leadership in organizations* (8th ed.). Pearson.

Zima, A. (2022, October 12). *NATO's enhanced Forward Presence (EFP) in the Baltic States and Poland: Assets and limits of the multilateral conventional deterrence* (IRSEM Research Paper No. 131). Institut de Recherche Stratégique de l'École Militaire. https://www.irsem.fr/storage/file_manager_files/2025/03/rp-irsem-131-zima-nato-en.pdf

Zimmerman, P., Ofori, M., Barrett, D., Soler, J., & Harriman, A. (2019). Considerations and examples of a modular open systems approach in defense systems. *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology, 16*(4), 373–388. https://doi.org/10.1177/1548512917751281

Zhu, P. (2024). Current state and countermeasures of procurement collusion: An exploratory study. *Advances in Economics, Management and Political Sciences*. https://doi.org/10.54254/2754-1169/2024.ga18954

Appendix A – Compact codebook and scoring guidance

1. Introduction

This appendix provides a full list of definitions, coding rules, and data sources for the indicators in table 19. Each indicator is operationalised on a 0–3 ordinal scale to enable consistent evaluation across contexts. This appendix is intended to complement the CMO analyses in section 5.4.8 and the implementation roadmap in section 5.4.10 by serving as a practical coding manual and reference for researchers, auditors, and policy practitioners.

Coders should follow the rules below to ensure reproducibility and auditability of scores.

2. Scoring rubric (0–3)

Use the following rubric when assigning indicator scores. Select the highest score fully supported by verifiable evidence.

0 — Absent: No evidence of activity, mechanism, or documentation.

1 — Pilot/ad hoc: Fragmentary, inconsistent, or weakly verified implementation; activity exists but lacks continuity or formalisation.

2 — Partial: Mechanism or policy established but unevenly enforced, inconsistently applied, or only partly verified by independent sources.

3 — Institutionalised: Fully implemented, subject to independent audit, and evidenced by enforcement or demonstrable outcomes.

Coders must attach source citations and a one-line justification to every non-zero score.

3. Indicator definitions and measurement guidance

Measurement rules: For each indicator provide (a) the numeric score (0–3), (b) primary evidence source(s) with URLs or document identifiers, (c) date of evidence, (d) data-quality tag (Public / Classified / CSO-verified), and (e) a one-sentence coder justification.

Phase 1 – Strategic comprehension

1. % of mandated strategic reviews completed on schedule.

   Definition: Share of formally mandated strategic reviews completed within the official timeframe.

   Measurement unit: Percentage (0–100%).

   Sources: Defence ministry planning reports; parliamentary oversight records; published progress reports.

2. % of library scenarios stress-tested annually.

   Definition: Proportion of the organisation's scenario library subjected to structured stress-testing or red-teaming in a 12-month period.

   Sources: Foresight unit reports; red-teaming outputs; exercise summaries.

3. # of cross-agency analytic products published.

   Definition: Count of joint analytic products formally released and attributed to two or more defence, intelligence, or security agencies in a year.

   Sources: Interagency documents; joint publications; official press releases.

Phase 2 – Competitive positioning

1. Existence of a published national competitive strategy (binary, scaled).

   Definition: Baseline binary (0/1) for presence of a published strategy; scale (1–3) increases with external verification and frequency of formal updates.

   Sources: Government strategy documents; donor or partner verification reports.

2. % of budget aligned with strategic roadmap.

   Definition: Share of the approved budget whose line items explicitly map to priorities in the national strategy.

   Sources: Budget execution reports; parliamentary budget justification; independent budget analyses.

3. % of readiness metrics published and externally verified.

   Definition: Percentage of readiness indicators that are both publicly published and validated by independent or allied assessments.

   Sources: NATO/partner readiness reports; parliamentary hearings; allied verification statements.

Phase 3 – Organisational adaptation

1. % of doctrine harmonised across services.

   Definition: Proportion of doctrinal publications or key doctrine elements that have been harmonised and cross-referenced among services.

   Sources: Doctrine manuals; interoperability audit reports; joint doctrine publications.

2. # of adaptive procurement pilots launched annually.

Definition: Number of formally recorded procurement pilots using adaptive/modular pathways started in the reporting year.

Sources: MoD procurement logs; procurement authority announcements.

3. % of commands with interoperable processes.

   Definition: Share of operational commands exhibiting interoperable planning or logistics processes during live exercises or assessments.

   Sources: Exercise AARs; operational audits; interoperability certifications.

Phase 4 – Capability, innovation & procurement agility

1. % of budget allocated to R&D.

   Definition: Percentage of total defence budget earmarked for research, development, and innovation programs.

   Sources: Defence budgets; parliamentary fiscal reports; R&D programme allocations.

2. # of modular acquisition projects initiated annually.

   Definition: Number of acquisition projects explicitly employing modular/open architecture or incremental delivery.

   Sources: Procurement authority records; contracting notices.

3. # of innovation partnerships with private sector/academia.

   Definition: Count of formalised partnerships (MOUs, contracts, grants) with industry or academic institutions for innovation.

   Sources: MOUs; grant award lists; industry/academic press releases.

Phase 5 – Resilience & continuity

1. # of resilience exercises conducted annually.

   Definition: Number of exercises addressing civil defence, infrastructure resilience, or cybersecurity within the reporting year.

   Sources: Government exercise schedules; NATO resilience reports.

2. Composite civil preparedness score.

   Definition: Aggregated score combining validated indicators for health surge capacity, critical infrastructure redundancy, and cyber resilience. (Specify components and weights in coder notes.)

   Sources: Civil protection agencies; international assessments (World Health Organization, NATO, OECD).

3. # of crisis-response audits published annually.

Definition: Count of independent audits published following crisis management operations.

Sources: Audit agency reports; parliamentary inquiry reports.

Phase 6 – Leadership & human capital

1. % of officers completing JPME/joint training.
2. Definition: Share of officers who completed JPME modules in the reporting period.

   Sources: PME registries; institution training records.
3. Leadership diversity index.

   Definition: Composite index measuring gender, occupational background, and experiential diversity among senior leaders. (Report components and normalization method in coder notes.)

   Sources: HR records; diversity audits.
4. % of units with audited succession plans.

   Definition: Share of units that have documented succession plans reviewed by internal or external audit.

   Sources: HR inspection reports; audit findings.
5. % of leaders receiving ethics/mentorship training.

   Definition: Percentage of designated leaders who completed accredited ethics or mentorship modules.

   Sources: PME curricula; HR training logs.

Phase 7 – Performance & strategic learning

1. # of independent audits completed annually.

   Definition: Number of completed audits of defence activities by independent agencies or auditors.

   Sources: National audit office reports; independent audit publications.
2. % of reforms adjusted following M&E feedback loops.

   Definition: Share of documented reforms that were substantively revised as a direct result of monitoring & evaluation.

   Sources: Reform monitoring reports; parliamentary oversight records.
3. Public trust index.

   Definition: Survey-based measure of public trust in defence institutions (use reputable, methodologically transparent polls).

Sources: Independent public opinion polls; CSO monitoring reports.

4. Data sources (typical)

Official: strategy documents, minutes, procurement logs, audit/fiscal reports, PME registries, exercise AARs.

Independent: civil society reports, watchdog assessments, investigative media, donor evaluations, NATO/OECD readiness reports.

Note: Indicators should be triangulated between official and independent sources wherever possible; when divergence occurs, record both sources and justify the chosen score.

5. Data-quality tag usage

Coders must apply one data-quality tag to each coded item and document the rationale in the coder notes. The tags and usage rules are:

Public: Primary evidence is available in open, verifiable sources (official publications, press releases, published reports). Attach URLs and dates.

Classified: Evidence for this indicator exists but is classified; do not publish disclosive details. For public reporting provide only aggregated or time-delayed summaries; annotate the dataset entry with the Classification field set to "Classified" and record a brief justification (one sentence) in the coder notes. Define terms: Aggregated = summary statistics (counts, rates, percentages) with no individual or unit identifiers or sensitive geolocation. Time-delayed = public release deferred until operational risk subsides or until declassification; record the expected release condition or date in coder notes. Action: When tagging Classified, coders must: (1) place the detailed evidence in a secure repository per organisational protocols; (2) record the classification level and brief justification in the coding log; (3) prepare a non-disclosive public summary (aggregated/time-delayed) where required.

CSO-verified: When official data are absent or insufficient, use civil society, third-party audits, or validated NGO datasets; document the verification method and any limitations.

Note: Coders should always select the most transparent category consistent with source constraints. Where multiple tags apply, choose the tag that allows the greatest transparency while preserving security and legality, and document the decision.

6. Contextual moderators — assessment and use

Baseline assessments must record contextual moderators that affect interpretation and sequencing of reforms. Typical moderators include:

- Political: judicial independence, media freedom, party-finance exposure, legislative oversight capacity.
- Economic / industrial: supplier market concentration, domestic defence industrial base maturity.
- Institutional: bureaucratic rigidity, civil–military integration, procurement centralisation.
- Operational / contextual: crisis intensity, level of international support, active conflict status.

Note: Moderators should be recorded alongside indicator scores and used to (a) qualify interpretation, (b) determine feasible sequencing of reforms, and (c) identify appropriate external levers (donor support, allied assistance). Document the source and date for each moderator.

7. Implementation note (checklist format)

This checklist provides an operational sequence for applying the framework in table 19. All items require source citations and coder notes.

Baseline (Year 0): establish starting profile.

- Populate table 19: assign 0–3 scores for all indicators with supporting citations.
- Record contextual moderators: judicial independence, media freedom, fiscal transparency, crisis intensity, etc.
- Apply data-quality tags: Public, Classified, CSO-verified, and add coder justification.
- Secure classified evidence: if applicable, follow data security protocols and log classification metadata.

Pilot stage (Year 1–2): bounded co-implementation.

- Select two domains for testing (recommended: one structural domain, one behavioural domain — e.g., Phase 4: procurement; Phase 6: leadership).
- Co-implement structural and behavioural mechanisms. Ensure pilots include clear M&E indicators.
- Record quarterly indicator scores and produce a short pilot report.
- Commission at least one independent audit and one CSO verification of pilot outputs.

Scaling (Year 3–5): institutionalise successful pilots.

- Expand successful mechanisms across relevant ministries, services, or commands.
- Institutionalise key provisions (e.g., procurement anti-capture safeguards, PME reforms) through regulation, doctrine, or formal policy.
- Embed oversight and audit functions (internal audit, parliamentary oversight, independent review boards).

Routine monitoring & evaluation (Year 5+): sustain accountability.

- Annual scoring of all indicators (0–3) with public summaries where security allows.
- Independent audits at least every two years.
- CSO verification on an annual basis.
- Comprehensive external review every five years combining process tracing, stakeholder interviews, and cross-case comparison.

8. Coder instructions (practical checklist)

- Evidence citation: include URL/document ID and date for every source cited.
- Justification: provide a one-line justification for each non-zero score describing the supporting evidence.
- Classification logging: if tagging Classified, fill the Classification field, state the classification level, and give a one-sentence reason. Store full evidence in the authorised secure repository.
- Triangulation: wherever possible, corroborate official claims with independent sources; if conflict exists, note the discrepancy.
- Versioning: record coder name, date of coding, and version number of the dataset entry.
- Transparency: attach a non-disclosive public summary for items tagged Classified (aggregated statistics or time-delayed narrative).