

THE ART OF SCALING

NL ARMS – 2025

Organising
Swift Adaptation
to Cope with
Crises and War



Edited by

HUIB ZIJDERVELD | FLORIBERT BAUDET | ANNELIES VAN VARK
RENÉ MOELKER | EDWIN DADO | RONALD VUIJK

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Foreword

by the Vice-Dean of the Faculty Military Sciences / Netherlands Defence Academy

The Netherlands Annual Review of Military Studies (NL-ARMS) is an annual publication of the Faculty of Military Sciences of the Netherlands Defence Academy. This peer-reviewed series offers an overview of cutting-edge scientific research on military sciences drawing on scholarship from researchers at the Faculty of Military Sciences as well as colleagues from other academia and the Netherlands Ministry of Defence. This year's NL-ARMS emphasizes scaling, one of the most pressing themes influencing European armed forces nowadays.

Scaling is *en vogue* within the military and security domain. Geopolitical tensions, the ongoing wars in Ukraine and Gaza and the call for more autonomy are just a few reasons why European armed forces are scaling up. Politicians, practitioners and academics alike have each stressed the importance of scaling up the armed forces. European Commission President, Ursula von der Leyen, remarked during the presentation of the White Paper for European Defence in March 2025: *“The era of the peace dividend is long gone. The security architecture that we relied on can no longer be taken for granted. Europe is ready to step up. We must invest in defence, strengthen our capabilities, and take a proactive approach to security.”*

At a national level, the Dutch State Secretary for Defence, Gijs Tuinman, wrote in a letter to Parliament: *“The Dutch MoD is deploying deployable and scalable armed forces that can adjust itself to the threat, deter and, if necessary, defend the territory and interests of the Netherlands and NATO allies. The need to have this quickly available was already crystal clear since the Russian invasion of Ukraine, but is becoming significantly more urgent now that geopolitical reality is leading to Europe increasingly having to bear its own responsibility for security on the continent.”*

When referring to scaling, politicians, practitioners and the media often emphasize the size of the military workforce. While this is undoubtedly an important aspect of scaling, many more issues are at play. Scaling is a multifaceted phenomenon that lacks a generally accepted definition. As the contributors to this publication demonstrate, scalability not only requires the ability to grow or shrink in size, but also to adapt organizational behavior and structures. In an abstract manner key issues involve how to scale, into what and on basis of which expectations about the future? More tangibly, one needs to consider how to make use of a country's industrial base, how to procure military equipment and material in a

timely manner, how to organize for scaling as well as how to enable technology to scale up the armed forces.

This edition of NL-ARMS, *The Art of Scaling*, explores various aspects of scaling, illustrating that scaling implies much more than merely increasing the military workforce. The first part of the book addresses historical perspectives and explores what we can learn from different historical episodes when it comes to scaling. The second part addresses various perspectives on organizing for scalability. Contributors show different organizational models, designed to support scalable organizations. This includes discussions on public-private partnerships in the context of drone ecosystems and robotization, as well as the importance of strategic flexibility and the implementation of mission command. The third part of this book focuses on enabling scalability and includes chapters on conscription, financial scalability and scaling military education.

The Art of Scaling is relevant to academia, policy makers and practitioners. Scaling is an area of knowledge where theory informs policies, strategies, and behavior and those in turn inform subsequent theorizing, as various chapters in this book attest to. It is also a book with direct relevance for thinking about today's security challenges that feature prominently on the policy agenda of the Netherlands Ministry of Defence, the Ministry of Foreign Affairs, and international security organizations such as NATO and the EU. Last but not least, the book provides many lessons to practitioners that are tasked with scaling up the armed forces.

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Foreword

*by the Secretary-General of the Netherlands Ministry of Defence
and the Netherlands Chief of Defence*

Great minds think alike. Isn't that how the saying goes? But we don't really agree with that, as the second half of that saying tends to be forgotten: Great minds think alike, but fools seldom differ. Anyone who serves or has served in uniform knows that a well-functioning team requires people with different skills *and* different perspectives. What we need is great minds thinking differently, coming together to achieve a common goal.

That goal is clear: our armed forces, our Defence organisation and our society need to be ready for a large-scale conflict and must be ready to contribute substantially to the Allied victory. True societal resilience consists of both military and civilian preparedness. Therefore, in view of the challenges ahead, it is necessary to raise awareness and better engage society at large in order to make more scalable armed forces truly possible. Such scalable armed forces must resemble a Swiss Army Knife of sorts: compact, virtually unbreakable, yet able to flexibly expand into whatever we need it to be. We need to shift our focus and involve large parts of society, including other parts of government, private enterprises and civil society in our preparations. As Winston Churchill reportedly said, 'To be a reservist is to be twice a citizen.' Many people are indeed ready, willing and able to step up when necessary, but we need to be better at explaining the ways in which people can contribute.

At the same time, we realise that this is easier said than done. We can't just keep on adding layers of reservists to the mix and expect everything to work. First and foremost, we need to think about the type of skills that we need – logistics or medical personnel, for example. Furthermore, we need to think about new organisational models and technologies, and understand how to best care for those who are contributing in uniform on a part-time basis. In other words, we need to modernise and refine our human resource management. Regarding society, we have to raise awareness and bolster resilience without causing panic. We have to learn from the experiences of our partners in the international community and see whether their best practices can be implemented in the Netherlands. We also have to look at the past in order to identify the kinds of mistakes that we can avoid as we go forward, even if the challenges that we face today are not identical to the ones

that we faced in the past, not least because traditional battlefields have now been joined by battlespaces that include the cyber and space domains.

The authors of *NL ARMS* have put their minds to work and have taken the time to contribute to what is an ongoing process. They provide various perspectives on how to quickly scale up the armed forces in the most intelligent, sustainable way and increase societal resilience. We believe that these perspectives will stimulate thinking both at the Ministry of Defence and within the armed forces and help in the development of solutions to pressing problems. We wish to express our gratitude to both the contributors and the readers of this publication for delving into these complex and vital matters.

Maarten Schurink, Secretary-General of the Netherlands Ministry of Defence
General Onno Eichelsheim, Netherlands Chief of Defence

Introduction

*Huib Zijderveld, Annelies van Vark, Floribert Baudet,
Edwin Dado, René Moelker & Ronald Vuijk*

The art of scaling

The full-blown Russian attack on Ukraine confirmed concerns that had been brewing for some time. The Western armed forces could be called up to shift their focus away from expeditionary exploits such as peacekeeping, peace support, and stabilisation operations for the defence of national and allied territory. This sent a shockwave through European militaries as they realised the large transformation this required, as well as their lack of readiness after decades of budget cutbacks. The Dutch armed forces adopted scalability as the concept to achieve this transformation from expeditionary armed forces to a military focused on warfighting. However, while there is awareness that scalability involves both quantitative and qualitative aspects and requires innovative ways of working, a clear understanding of the concept is lacking. This book attempts to fill that void. In this first chapter, the context leading to the new focus of the Dutch armed forces is described, followed by a section on the concept of scalability, the purpose of this book, and the structure of the book.

Context: Russian war of aggression in a multipolar world

NATO responded to Russia's instrumentalisation of Russophones in Crimea and Eastern Ukraine by deploying a limited number of ground forces in the Baltic and policing the region's air-space, but these measures were aimed primarily at reassuring the exposed member states on the alliance's flank haunted by vivid memories of Russian and later Soviet rule. The international composition of these task forces ensured that all allies were involved and not only conveyed the message of allied unity but also suggested that if matters would take a turn for the worse, this would affect all allies and thus help ensure that a localised incident would trigger an Article 5 situation. In short, eFP (Enhanced Forward Presence) serves as a trip-wire.¹

While this was markedly different from the days of expeditionary warfare, it can be maintained that this did not immediately drive home the message that a new era was dawning and that the age of wars of choice might well be nearing its

close. However, the Russian war of aggression in Ukraine is only one example of a 'fragmenting world order', as the Netherlands Scientific Council for Government Policy has stated in a recent report.² Five superpowers (the United States, Russia, China, India and the European Union) are increasingly competing for (military and/or economic) power, resulting in a multipolar world. China increasingly intimidates neighbouring countries around the South China Sea and aims to annex Taiwan. Both China and Russia are increasing their influence on the African continent, at the expense of European and American influence. On the 7th of October 2023, the Israeli-Palestinian conflict entered a new and particularly bloody phase. While in all of Israel's wars since 1967, the parties involved have attempted to mobilise public opinion in the West and elsewhere, both Israel and various Palestinian groups now are quite successful in applying cognitive warfare strategies and galvanising support on the streets and campuses, but also on social media, across Europe and the United States, raising concerns over social cohesion and rising antisemitism, and fuelling (right-wing) anti-Muslim and anti-immigration sentiment that has translated in an increase in support for isolationist policies.³

Against the backdrop of these developments, European countries have increasingly become aware of their vulnerability, especially in light of the new Trump Presidency in the US and the impact this may have on the strength of NATO. Many armed forces not only found their training grounds sold, but simulations and analyses of the war in Ukraine indicated that ammunition stocks were dangerously low. Other relatively well-hidden vulnerabilities were equally exposed, such as the realisation that the number of casualties on any given day in Ukraine far exceeds current military healthcare capabilities.

Additionally, while there is no physical war on NATO territory, in the so-called grey zone between war and peace attacks take place on a daily basis. Cyberattacks are one example, but we have also seen various incidences of physical sabotage of undersea infrastructure.⁴ Furthermore, foreign influence operations and disinformation campaigns aim to influence elections and destabilise European societies, with a recent example found in the Romanian and Moldovan presidential elections, but earlier on, the plebiscite on Brexit.⁵ These activities seem deliberately devised to remain below the threshold of attack – at least in the sense Article 5 is usually understood. From NATO's perspective these are not acts of war, even though they are conducted with hostile intent and NATO member states and especially those on its eastern flank have recognised as much.

The increasingly assertive posture of the People's Republic of China in the South China Sea and beyond, is also a cause for concern. Not only because of its actions in relation to Taiwan, but also because of its creative use of the Law of the Sea to expand its Exclusive Economic Zone and territorial waters by artificially expanding atolls and building airstrips and facilities on them. Given this sea's importance

connecting the economic powerhouses in East Asia with the Indian Ocean and from there, customers in Europe, these activities have reinforced the view that Europe's and Asia's security are in fact interconnected.

The election of Donald Trump as US President in November 2024 also affects the Europeans' sense of urgency. In Trump's first term in office, he repeated a mantra often heard in Washington since 1949, namely that the European powers ought to contribute more to their own defence. Unlike his predecessors however, he suggested that a failure to do so would justify a refusal on the part of the United States to uphold Article 5; only members that spent more than 2% of their GNP would be defended by NATO in case of an armed attack. Most Western European NATO members did not directly feel compelled to comply, but the threat undermined the credibility of the alliance, a development that was reinforced by the President's talk of the US leaving NATO.⁶ Unfortunately, the Trump Presidency did not only contribute in this sense to the deteriorating security environment. Unilateralism dominated his first term and the threat to annex the Panama Canal, voiced at his inauguration on 20 January 2025, Canada and Greenland, do little to assuage concerns.⁷ If anything, these undermine both Western cohesion and whatever is left of the post-1945 international order.

Seen in a somewhat more positive light, the US' growing interest in security in the Pacific increases Washington's need for allies that can have its back and, if need be, can contribute to the defence of these Pacific interests. Australia played this card, and, seemingly, not without success.⁸ For this eventuality however, European states need to invest more, and do so on the basis of a strategic vision, that was actively discouraged by Washington before its pivot to China from the 1990s onward, and has been largely lacking since. Today's pressures, however, require bold answers that involve exploring new ways of European defence cooperation and integration. All this means that the post-1989 unipolar world is dead and buried, and the post-1945 arrangements may well follow. We have entered an era of Great Power Competition and large-scale war between the great powers has become a real option.

This realisation sent shockwaves through military establishments and instilled a sense of urgency not felt since the days of the Cold War. This was true also for the Kingdom of the Netherlands. It resulted in a new focus on what is called 'first core task', the defence of national and allied territory, including the Caribbean constitutional parts of the Kingdom. The second core task, the promotion and protection of the international legal order and stability, that underlay the previous deployments of the armed forces in peacekeeping and stabilisation operations, is currently considered of lower importance, and so is the third core task that envisions support to the civil authorities in public order management, law enforcement, disaster relief and crisis management, both nationally and internationally.

At the same time it is clear that while the Cold War (or earlier periods of mobilisation) may offer inspiration, it does not necessarily offer guidance as to how to respond – if only because many Cold War preconditions have disappeared.⁹ Back then, hundreds of thousands of conscripts could be called to their stations within days, while, today, almost all Western armies consist of a core of professional soldiers that can be reinforced with reservists – there is no reservoir of trained conscripts. Having to start from scratch, in the short term reintroducing conscription does not constitute a meaningful response to the perceived threat. In fact, it can even be counterproductive when the need for instructors robs operational units of their cadres. This would diminish their fighting power and, thus, their value as a deterrent. Different approaches will need to be contemplated.

In addition, it is far from certain that a peer-to-peer war would manifest itself on the battlefield only. In the Cold War, there was an ideological struggle between liberal democracy and communism. The current era is characterised not by a struggle between democracy and communism, but by a persistent flow of disinformation from totalitarian states to democratic ones. What use is a large conscript army, or, in fact force, when the war is fought by non-violent means and involves the hearts and minds of the people, subversion of liberal democratic structures and the financing of extremist political parties? This rather calls for ‘psychological defence’, which is part of the ‘total defence’ model discussed below. Nonetheless, barring the full reintroduction of conscription and the concomitant full mobilisation of society in war, problematic in itself, the armed forces somehow ought to be able to quickly expand (or “scale up”, in current parlance) to be able to fulfil their constitutional tasks.

Other threats: the impact of climate change

It was, however, not only man-made crises that underscored the need to rethink security. Man-induced crises, such as climate change produced a range of new challenges that increasingly are considered security threats: rainfall may produce floodings, and droughts may cause famine which both can act as incentives for people to leave their homes and try their luck elsewhere. Thus, climate change may produce refugees, but shortages in water or arable land may also be a cause of conflict.¹⁰ This does not only happen in areas most citizens in the West do not know or care about, they also may happen closer to home. A few years back the Dutch town of Valkenburg was partially flooded after torrential rains, and in the summer of 2024, rainfall in Central Europe claimed the loss of several lives and led to considerable damage to the local infrastructure. Western societies generally are resilient and rich enough to weather such challenges, but here too, a combination of events may wreak havoc and cause disruption.¹¹ These challenges are primarily connected to the third core task of the armed forces, support of civilian authorities.

Total defence in a new era

While states thus feel the need to be able to respond adequately to the challenges outlined above, the question of *how* to do that is difficult to answer. It is in this context that concepts like *whole-of-society* and *whole-of-government* gained traction, even if their precise meaning or applicability is far less clear than usually assumed.¹² Historically, the total defence concept originated in Scandinavian countries during the Second World War, as a response to total war, which had blurred the boundaries between the military and civilian domains and involved the full mobilisation of society. This called for ‘total defence’, for which, likewise, the entire society had to be mobilised, hence the related term ‘whole-of-society’.¹³ This makes the concept broader than ‘whole-of-government’, which refers to cooperation within (all levels of) government, which is not necessarily a characteristic of total defence only – it is also called for with states that pursue a grand strategy. In Fiala’s definition however, total defence involves *both* a ‘whole-of-government’ and a ‘whole-of-society approach’. It “includes all activities necessary to prepare a nation for conflict in defense of its independence, sovereignty, and territorial integrity; it consists of both civil and military defense [...and...] encompasses all societal functions.”¹⁴ Other definitions stress similar elements but focus on different aspects. In some definitions total defence also includes the business community, whereas others are limited to civil society organisations, the media and individual citizens. It is therefore a Defence-centric concept, aimed at defence against an external military threat. In addition to military defence, economic defence (including the protection of supply lines and the stockpiling of supplies), psychological defence (including the fight against disinformation) and civil protection (including the construction of bunkers and the making of evacuation plans) are part of the total defence model.¹⁵

These concepts have in common that citizens are expected to be prepared to defend their country and its core values and countries such as Sweden and Finland have also laid down this obligation in their constitutions. Hyvönen and Juntunen call this the ‘spiritual component’ of the model and point to the ‘enlightened patriotism’ that is part of it.¹⁶ With it comes a moral duty to increase resilience, that they define as the ability to (a) withstand the effects of a major disruption, (b) maintain the capacity to act during a crisis and (c) bounce back from the crisis and learn from it to increase one’s own adaptive capacity towards the future.¹⁷

As outlined by Forfang Rongved, deterrence is an important intended effect of a total defence or whole-of-society approach. He expects total defence arrangements to “become increasingly important to preparedness and defence concepts in allied and non-aligned countries alike – especially those bordering Russia.”¹⁸ Forfang Rongved refers to the work of James Wither, who in an article on Nordic total defence concepts defines total defence as “a whole-of-society approach to national

security intended to deter a potential enemy by raising the cost of aggression and lowering the chances of its success.”¹⁹ Forfang Rongved furthermore explains how total defence concepts may be an attractive option for small states without large standing armies.²⁰

In recent years, in reaction to the Russian invasion of Ukraine and in view of the growing range of threats and challenges it identifies, the Dutch government also formally adopted a total defence approach. In a late 2024 letter to Parliament, it outlined what it believes needs to be done from a whole-of-government and whole-of-society perspective in order to achieve societal resilience and military readiness against military and hybrid threats. The letter defines a resilient society as a society in which government, public and private partners, NGOs, knowledge institutions and citizens are prepared for social disruption and have the ability to withstand, handle and recover from it. The concept of scalability is identified as a way to achieve military readiness against military and hybrid threats.²¹ Additionally, the letter emphasises the need for support by civil actors (both public and private) to the armed forces, both in their preparation for a possible war scenario and in the event such a scenario would occur.

Scalability

However, like *resilience* and *total defence*, scalability, too, is a multifaceted concept with no generally accepted definition. To name but a few, Van Dale, the standard Dutch dictionary, defines ‘scalable’ as: ‘suitable to be adjusted in size’, with the examples ‘scalable production, technology’ and ‘a scalable organization’. Originating in the IT sector, in recent years the concept has been used in the innovation context to describe the process from local-level innovations to large-scale or systemic impact. A recent article however differentiates between *scaling up* (changing institutions at the level of policy, rules and laws), *scaling out* (replication and dissemination, increasing number of people or communities impacted) and *scaling deep* (changing relationships, cultural values and beliefs, ‘hearts and minds’).²² These various understandings of the concept of scalability illustrate that there is both a quantitative and a qualitative side to it, i.e., organisations need to be able to *grow and shrink in size*, but also be able to *behave and organise differently*. It is this last understanding that underlie internal discussions at the Dutch MoD level, where the concept was adopted as a response to the deteriorating security environment with a view to facilitating the reorientation from expeditionary peacekeeping and stabilisation operations to a warfighting scenario. Their working definition was subsequently communicated to Parliament and forms the basis of the current governmental view on scalability:

...armed forces that are able to deploy capabilities (personnel, materiel, infrastructure, knowledge, etc.) from the organization and from society in a controllable manner and within a short period of time. Scalable armed forces can both scale up (grow both qualitatively and quantitatively) and scale down (shrink) and thus adapt to the threat context. The scalable armed forces must be able to rely on the whole of society in different areas (materiel, real estate, space (e.g., to practice)), services, healthcare, and more.²³

While this definition seems to focus on *scaling out*, the project in practice also contains elements of *scaling up* (e.g., amending existing laws or passing new ones to give the armed forces more space – also literally – to practice and prepare for a warfighting scenario) and of *scaling deep* (the shift in focus from stability operations to warfighting involves a mind-shift within the armed forces). Policy makers soon found that devising a working definition is but one part of the challenge. Key issues involve *how* to scale, and into *what*, and on the basis of which expectations about the future; another issue is how to incorporate the current experiences of Ukraine and to benefit from the examples of various, especially Scandinavian, NATO Allies. Is it possible to merely transfer such examples or do scaling solutions need to be specifically tailored to the Dutch context in order to work?²⁴ And how does temporality and time impact scalability? The crisis literature primarily conceptualised crises as short high impactful events; however, we are increasingly dealing with creeping crisis,²⁵ impacting multi-organisations without a clear starting point, nor end state. Running a marathon instead of a sprint requires scaling by the organisations involved.

Yet another key issue is how to cooperate and coordinate between the various governmental agencies, the private sector and civil society for whose benefit such preparations are made. Who is in charge? And what roles should they perform? How do we involve the private sector, civil society and even the general public? What role is there for free enterprise? Do we prefer European arms over American ones or the other way around? How do we free capital for investment without giving carte blanche? This also involves instilling a sense of urgency in society without provoking panic or outright paralysis, or silencing voices that question the wisdom of such measures. After all, the armed forces may believe that scaling up is a defensive measure, yet as it contributes directly to greater fighting power it could well be interpreted as a mobilisation of sorts. In the past, strategic communication was primarily directed at our opponents, but increasingly it is aimed at domestic audiences that need to be convinced of the urgency and thus invites the question of to what extent the government may try to shape public opinion in a democratic society. A look into the past reveals that this is by no means a new question; in 1946, Parliament ordered the government to stop using the *Rijksvoorlichtingsdienst* (Government Information Service) to actively *sell* policies to the public. In this

particular case, information officers were hardly deterred and continued their information operations in a different guise, which Parliament tacitly accepted as the Cold War had erupted and fear of domestic communists was widespread.²⁶ In addition, is spreading the message the public needs to prepare for war the best way to bolster resilience? Or should the government focus on an all-hazard approach, given the various threats following from climate change (extreme weather events, heat, forest fires, floodings) that may have the same implications as an attack (physical or in the cyber domain) by an adversary? What exactly is it the public is required to help defend? Does resilience not also involve a democratic society based on the rule of law – if only because these are mentioned in the preamble of the 1949 Treaty of Washington as the key characteristics of the member states of NATO? Could it not be argued that the best way to bolster resilience is actually to curb big tech and foster societal cohesion by, for instance, maintaining or even elevating rather than downsizing the current levels of social security?²⁷ These are tough questions indeed, for which there are no simple answers, although the same discussion soured relations between the government and the military in the late 1940s and early 1950s.

Other themes have less obvious parallels in the past, although the creation of a separate Airforce – in the Dutch case, in 1953 – may be seen as a logical consequence of the specific organisational requirements that came with the introduction of a new type of weapons technology that operated within different time-space parameters from land forces. With it came a different organisational culture, different training requirements and different operational concepts.²⁸ On the basis of this, it is conceivable but by no means a foregone conclusion that the same will eventually happen to, say, today's Defence Cyber Commando whose battlespace has entirely different characteristics from that of an infantry unit. Is there a general rule of thumb as to how to best incorporate new technologies? And what can artificial intelligence or big data contribute to scalability? Does it help to limit the number of scenarios that planners have to consider? Does it free analysts for other tasks, or is it necessary to keep humans in the loop in order to evaluate an AI recommended course of action?²⁹ In short, scalability is a versatile concept that many use, but for which there is no clear, generally accepted definition. Behind every corner there is another question to consider to which there are no simple answers.

The purpose of this book

It is for this reason that this year's edition of the *Netherlands Annual Review of Military Sciences (NL ARMS)* is devoted to the topic of scalability. Coming from various academic, institutional and operational backgrounds, its contributors each

address aspects of and perspectives on scalability in the context of a resilient society against a military threat for which they loosely follow the definition outlined above. What is scaling up in the context of the armed forces and international security, why do we find scaling up (and downscaling) complicated, and how can we improve and strengthen these processes? Does past experience provide answers?

The answers the book offers should not be considered final. Rather, in formulating answers the authors hope to engage and inspire academic colleagues but also policy makers and practitioners in the Netherlands and elsewhere. It is they who struggle on a daily basis with the task of operationalising the concept and actually preparing the armed forces (and society at large) for a warfighting scenario. The book thus aims to have both academic and practical relevance. We aim to better understand the concept of scalability from an academic perspective, in order to contribute to the academic debate on this topic. On the other hand, we aim to provide practical perspectives and new ideas that can help practitioners in the armed forces (both in the Netherlands and in allied countries) to work on matters of scalability in their own organisation.

The structure of this book

This introduction is followed by 18 chapters that are divided into three themes that each provide a different perspective on scalability.

Theme 1: A historical perspective on scalability

The historical chapters delve into the magisterial potential of the past. Military organisations tend to identify “lessons” from experiences they or their counterparts had, the so-called *lessons learned* or *lessons identified*. In reality, identifying lessons is more complicated than that. While the demons of the past continue to haunt us and may seem on the verge of resurrection, past experience offers no guarantee of success or failure, only indications. However, the study of past experience may also stimulate thinking and a deeper understanding of the various elements and complexities in the present. It may do so by means of (apparent) analogy, or by contrast.³⁰ De Jong’s surprising contribution on the way the Dutch Republic during the 17th and 18th centuries acted as a guarantor for its privately-owned defence industry, may stimulate thinking on similar contemporary questions, while Baudet’s chapter on the first post-1945 war scenario that was developed in the Netherlands, analyses the role of analogy, (partly) unfounded assumptions and wishful thinking in this scenario. It was based on the experience of the Baltic States after 1940 without ever clarifying why this would be the most likely course of

events for the Netherlands. As the scenario was the basis for all kinds of stepped-up civil and military war preparations, this is a grave omission. Lastly, Hoffenaar and Sanders discuss the mobilisation system that came into being after the Dutch accession to NATO in 1949. They argue that while the strategic situations and societal perceptions thereof differ, it is especially these differences that makes studying the Cold War and the mobilisation system in place back then a worthwhile endeavour. That system was embedded in a setting in which the threat was felt to be real and the prospect of war in the heart of Europe all too likely. While the Cold War was in many respects a hybrid war, if all-out war came, full mobilisation was inevitable. Past arrangements may be studied to inspire new ones, such as the alliance-wide alert system, the use of forward depots, and, lastly, the close coordination with civilian actors.

Theme 2: Organizational perspectives on scalability

Scaling implies organisational change. The authors explore the possible changes from organisational perspectives, from empirical and/or theoretical work, and demonstrate that people, organisations and political agencies are interdependent. In Chapter 4, Fenema and Raab discuss scaling of resources from an organisational network perspective. In this exploratory study, the authors delve into how (defence) production networks scale their capabilities in terms of upstream resources, also when a palpable crisis is not (yet) happening. Using the Dutch military drone ecosystem as an example, it focuses on ambitions and foundations for ecosystem development. But environments are unpredictable and that is why Verhulst in Chapter 5 discusses strategic flexibility from an emergent innovation perspective. Verhulst presents a model for positioning four mechanisms of scalability related to strategic adaptability. Using the sociotechnical concept of generativity to reflect on current practices around scalability, he explores the complexity of intraorganizational challenges on organising for emergent innovation as a mechanism of change. What obviously helps is to consider organisations as consisting of Lego pieces. Piecing organisations together like Lego is one answer to scaling up. Dado, Petersen, Leertouwer, Moeskops and Schmets consider Legolisation important in the field of Scalable Defence Infrastructure. This chapter (6) focuses on scalable and adaptive large-scale military infrastructure and facilities and explores how the integration of Legolisation, and industrial, flexible, and demountable (IFD) construction, as derived from the civilian Building and Construction engineering practice, can address these scalability and adaptability challenges. Kramer, Van Os and Verhulst in Chapter 7 use a sociotechnical lens in their chapter to highlight how organisational structures shape the integration and scaling of technological innovations. They identified a framework, consisting of four types of socio-technical

innovation, to analyse associated challenges. This framework is then used to focus on a project in the Netherlands Armed Forces on Robotics and Autonomous Systems (RAS) and the innovation process around the THeMis robot. Van Lit (Chapter 8) looks at structuring the military for large scale combat operations and explores the potential of scalability in ensuring readiness for a small nation like the Netherlands for large-scale combat operations. Scalability offers a pathway to bridge readiness gaps while balancing operational demands with resource constraints. Goes, Janssen and Van Oers (Chapter 9) delves into healthcare initiatives for resilient wartime response. The authors note that the current medical care system cannot scale up to treat larger numbers of victims during a large-scale military conflict. The authors see medical evacuation by train, strengthened civil-military cooperation and improved training for medical personnel as solutions. Van Loon and Mastenbroek in Chapter 10 approach the role of mission command in scaling up the armed forces and discuss military leadership which is seen as a critical condition for establishing scalable armed forces.

Theme 3: enabling scalability

Moelker and Noll (Chapter 11) focus on different models of recruitment. Scaling up conscription is a way to raise the numbers and to create a considerable reserve component. The All Volunteer Force model (the professional army) is not adequate for large-scale scaling. Some models of conscription fit the exigencies of modern society better than others (voluntary, inclusive, selective, legitimate). De Weert and Levels in Chapter 12 use a comparative approach to building societal resilience by analysing both the Netherlands and Finland. Finland has become famous for implementing a whole of society system from which others can learn. This chapter provides insight into strategies that can build broad societal resilience against hybrid threats. It studies four necessary conditions of resilient societies, i.e., social cohesion between citizens, psychological resilience, media literacy, and household preparedness, and discusses the extent to which these policies can be implemented in the Netherlands. Chapter 13 is devoted to exploring grassroots knowledge production and more specifically considers crowdsourcing for military intelligence. The authors, Van der Meulen and De Werd, discuss crowdsourcing as a way to acquire knowledge from the bottom up in the armed forces. They note that much knowledge within the armed forces remains untapped. Van der Meulen in Chapter 14 explores the wisdom of crowds and discusses ways in which external crowdsourcing may reinforce intelligence services' reach. De Ruiter discusses the scaling of military education in wartime (Chapter 15). Scaling military education is in part historical, comparative and contemporary. Lessons from the Second World War, present day Ukraine, and European joint staff colleges point in the same

direction: whatever happens, education is important to scale up the officers corps. The content of education and the structure (for example length) may vary according to necessity, and it varies according to the phase of scaling. Requiring balance, scaling down entails a return to the curriculum from earlier phases whilst scaling up often is a reaction to an emergency situation. Bogers, Hogendoorn, Heeren and Beeres look at the scalability of NATO armed forces from a financial-economic perspective in Chapter 16. The authors take a financial-economic perspective by comparing fluctuations in NATO member states' defence spending during 1980-2024. The main finding is that up- and downscaling is mainly realised by increasing and decreasing expenditures on equipment. In Chapter 17, Hardeman, Bertrand, van Lieshout and Beeres discuss financial scalability of the defence industry by private equity. Their research indicates that the involvement of PE in the Dutch defence industry is still small, but when applied leads to higher average assets, revenues and profits, indicating potential for financial scalability in the short term. Lastly, Chapter 18 by Voetelink studies export controls. Export Controls focusses on sanctions, restrictions, and screening, and discusses how aforementioned tools can be scaled up in use, either tightening or relaxing the export of strategic items.

Notes

- ¹ Noll, Bojang and Rietjens, "Deterrence by punishment or denial? The eFP case"; Zapfe, "Deterrence from the ground up", 150.
- ² Wetenschappelijke Raad voor het Regeringsbeleid, *Nederland in een fragmenterende wereldorde*.
- ³ Schrijver, Nietzman and Pijpers, "Birdwatchers on social media: The mediasation of intelligence organisations"; Stein, *Screen shots*; Hirschberger, *External communication in social media during asymmetric conflicts*; Mann, *Occupying habits*. For a general study on the effects of media coverage of war and atrocities, see Borer, *Mediating suffering*. See also Beyer, *Online communities and political mobilization*.
- ⁴ Cf. Jordán, *How to interpret the Russian sabotage campaign in Europe*.
- ⁵ AIVD, MIVD and NCTV, *Dreigingsbeeld Statelijke Actoren 2*.
- ⁶ Hellman, "Trump threatens to pull out of NATO".
- ⁷ Trump, *The Inaugural Address*.
- ⁸ As outlined in Australia's *Defence Strategic Review* (Canberra 2023). See also Fraioli, "Australia's 2023 Defence Strategic Review", and Dibb and Brabin-Smith, "What the defence strategic review got right – and got wrong"; Kilcullen, "Australian statecraft". Compare: U.S. Department of State, "The United States-Australia relationship".
- ⁹ See for various mobilisations and mobilisation plans in the Netherlands, Sanders and Baudet. "Civiele verdediging en civiel-militaire interactie in Nederland tijdens de Koude Oorlog"; Van Doorn, *Met man en macht*; Klinkert and Schulten, *Mobilisatie in Nederland en België: 1870-1914-1939*; Abbenhuis, "The mobilisation, July-August, 1914"; Muilwijk, *1815: from mobilisation to war*. On mobilisation in general, see among others Moran and Waldron, *The people in arms*; Strohn, *How armies grow*; Chickering and Förster, *Great War, total war*; Verhey, *The spirit of 1914*; Shearer, *Stalin*

- and war, 1918–1953; Cusumano, *Mobilization constraints and military privatization*; Kollmer et al., *Mobilmachung als Teil der Landesverteidigung*; Meschnig, *Der Wille zur Bewegung*.
- ¹⁰ See for instance Gootzen et al. *Leren van vrienden* that offers a comparison of the defence and security strategies of a number of countries and organisations, to wit Germany, Australia, France, Britain, Norway, NATO, and the EU.
- ¹¹ Frerks, Geertsma, Klomp and Middendorp (eds.). *Climate security and the military*. For a report on the Valkenburg flooding, see Asselman et al. *Overstroming en wateroverlast in Zuid-Limburg*. See further: Hemingway Jaynes, *EcoWatch: Deadly flooding in Central and Eastern Europe wreaks havoc from Austria to Romania*.
- ¹² Van Vark and Noll, “Total defence en resilience als antwoord op hybride dreigingen?”.
- ¹³ Valtonen and Branders, “Tracing the Finnish comprehensive security model”, and S. Larsson, “Swedish total defence and the emergence of societal security”.
- ¹⁴ Fiala, *Resistance operating concept*, 1–2.
- ¹⁵ Van Vark and Zijderveld. “Civil defence in Sweden”.
- ¹⁶ Hyvönen and Juntunen, “From ‘spiritual defence’ to robust resilience”.
- ¹⁷ Hyvönen and Juntunen, “From ‘spiritual defence’ to robust resilience”.
- ¹⁸ Forfang Rongved, *Total defence*, 2.
- ¹⁹ Wither, “Back to the future?” 62.
- ²⁰ Some important takes on small states can be found in Baldacchino and Wivel eds., *Handbook on the politics of small states*; Keohane, “Lilliputians’ dilemmas”; Long, “Small states, great power?”; Long, *A small state’s guide to influence*; Neumann and Gstöhl, “Lilliputians in Gulliver’s world?”; Vital, “The inequality of states”. To be sure, what constitutes a small state is open for debate. Baldacchino and Wivel, *Handbook on the politics of small states*, 2–7. See also Kruizinga, *The politics of smallness*.
- ²¹ Tweede Kamer der Staten-Generaal, “Weerbaarheid tegen militaire en hybride dreigingen”.
- ²² Moore, Riddell and Vocisano. “Scaling out, scaling up, scaling deep”, 67–84.
- ²³ Kamerstukken II, 2024/25, “Een dienmodel dat past bij een schaalbare krijgsmacht”.
- ²⁴ In this respect Forfang Rongved speaks of ‘a multiverse,’ *Total defence*, 8. See also Noll et al. “Mission impossible?”
- ²⁵ Defined by Boin et al. as “a threat to widely shared societal values or life-sustaining systems that evolves over time and space, is foreshadowed by precursor events, subject to varying degrees of political and / or social attention, and impartially or insufficiently addressed by authorities.” Boin, Ekengren and Rhinard. “Understanding and acting upon a creeping crisis”.
- ²⁶ Wagenaar, *De Rijksvoorlichtingsdienst*; Cornelisse, *Uit oogpunt van eenheid...60 jaar Voorlichtingsraad*; Baudet, *Het vierde wapen*.
- ²⁷ Compare Black, *Strategy*, 220–221.
- ²⁸ Compare Overy, *RAF*; Rice, *The politics of air power*.
- ²⁹ See for instance Pijpers, Voskuil and Beeres, *Towards a data-driven military*.
- ³⁰ cf. Klinkert, *Over bommen, Normandië en geschiedenis*. Much has been written about the magisterial potential of the past and its utility or lack thereof to the military. See Carl von Clausewitz, *Vom Kriege*, chapter II; Liddell Hart, *Why don’t we learn from history?*; Howard, *The lessons of history*, 8; Sinnreich, “Awkward partners”; Baudet, “Ranke and files: History and the military”. Of note is also Sibul, “Military history in professional military education”.

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PART 1

Historical Perspectives

Military Reforms and Upscaling: the Case of the Dutch State Army and Navy 1585-1621

Michiel de Jong

Abstract

This chapter addresses how the reforms in the Dutch state army and fleet of the admiralties in the years 1585–1621 formed important incentives for an impressive process of scaling up, improved organisation and tactics, expanding their operations and regaining the strategic initiative against the Spanish Habsburg Empire. Its focus is on the supply side: logistics, finances and arms industry (trade and production). Thus, this chapter focuses on the material incentives and initiatives of the Dutch state authorities and merchant-entrepreneurs for executing these reforms and expanding the armed forces and its operations. The main conclusion is that in order to execute these developments, the influence of the Dutch state authorities on the supply side of the army and fleet was large. The Dutch state authorities took away bottlenecks for merchant-entrepreneurs in the arms industry, so that it could meet the challenges of the organisation, standardisation and increasing scales of supply. The impact on the Dutch economy was even larger: the Dutch state, their reforms and standardisation not only increased the firepower on land or at sea, but also provided continuity for merchants in overseas trade and shipping and accelerated their overseas activities.

Keywords: Upscaling · Military reforms · Standardisation · Arms industry · State · Eighty Years War · The Netherlands

Introduction

With the sudden emphasis on Great Power Competition and the associated threat of a large-scale near-peer conflict, one could almost forget that the period of relative peace in Europe after 1945 is quite unique in the history of the continent. Although historical examples and analogies cannot simply be translated into policy, the study of historical experiences and historical dynamics can provide insights that may help to address contemporary issues. This philosophy not only formed the basis of the discipline of International Relations, which bases theory formation on the study of primarily historical casuistry. In recent years, it has also become more popular in the discipline of history, while it has always played a role within the

armed forces. Do they not study their own and other people's experiences with the aim of drawing useful lessons from them? It would seem obvious then to look at recent experiences, and therefore at recent history. Nevertheless, the Pentagon's Office of Net Assessment commissioned a study of the Great Game decades prior to World War I, a period that seems to have some parallels with the challenges facing the United States today.¹ Despite the obvious differences between that period and today's, this study should provide tools for understanding the strategies the United States should adopt to hold its own against rivals such as China and Russia.

The dynamics of interstate rivalry are not limited to the present or to the period prior to World War I, however. They are perhaps one of the most characteristic aspects of human history, even though we have only been able to speak of states in the modern sense since the 19th century, just as the concept of strategy only became commonplace in that same century, although for a long time it was understood differently than it is today. With these caveats, it is also possible to look at even earlier periods. An additional problem is that for those periods the source material is often incomplete and a good understanding of them requires skills that the average policymaker or politician does not have. The past is not a can full of instant lessons. That said, it is nevertheless useful to look at the way in which the Dutch Republic in the 16th and 17th centuries held its ground in the international arena. It was never the dominant power, but managed, especially by cleverly using its own capabilities, to keep the great powers Spain, and later France and England at bay.

Sparked by several factors, various provinces in the Netherlands revolted in 1568 and fought a war of survival on land and in the coastal waters against the Spanish Habsburg forces. During a temporary treaty, the Pacification of Ghent in 1576, the Spanish troops retreated to the Southeast of the Netherlands, but led by the Duke of Parma started an offensive campaign in order to quell the rebellion. His campaign led to the return of the Eastern and Northern Netherlands to Spain in 1584 and the conquest of Flanders, Brabant and the important port city of Antwerp between 1576 and 1585. After the loss of Antwerp in 1585 and the wealthy provinces of Flanders and Brabant, the army and navy of the United Provinces faced a major challenge. How to regain the strategic initiative from Spain in order to develop a well-defensible 'garden' around Holland and Zeeland, the remaining economic core of the Dutch rebellion? This 'garden' comprised the Northern Netherlands bordering on the major rivers, including control of the Scheldt to the South, and including territories in the East up to the passages between the peat bogs. This would protect the start of a flourishing economy of these two provinces and the Republic would be better able to repel Spanish attacks.

The army and navy had to be scaled up and improve their capabilities in order to be able to take offensive action, i.e., sieges to reconquer lost cities beyond Frisia,

Utrecht and Guelders and blockades of the Flemish coast and Antwerp in order to deteriorate the trade and shipping of the Spanish Southern Netherlands. To this end, tactical and organisational reforms were implemented. Starting from a crisis, the United Provinces, since 1588 called the Republic of the United Netherlands or Dutch Republic, managed to gain all strategic and tactical goals until 1598, in which fortune of war also played a role. In 1589, the Spanish army in Flanders (*Armada de Flandes*) commanded by the Duke of Parma was ordered by the Spanish king Philip II to divert its attention away from the Dutch rebels and mount a major offensive against France.² Meanwhile, the Dutch offensive against Flanders and Brabant led to several victories (Nieuwpoort, Grave, Sluis), but Spanish counteroffensives conquered Ostend and reconquered several forts and cities in the Eastern part of the Netherlands. In parallel, the Dutch navy launched several expeditions together with the English navy and the United East India Company breached the Portuguese Empire in Asia. As the Twelve Years Truce intermitted in 1609, the Dutch Republic was consolidated and *de facto* recognised by its Spanish foe.³

Main question and framework

This chapter addresses the key role that the Dutch arms industry played during the Eighty Years War in order to expand the Dutch army and navy and build up their capabilities in the period 1585–1621. Its development was nothing short of remarkable. When the Netherlands erupted in revolt in 1568, there was hardly an arms industry in the Northern Netherlands. Eighty years later when the United Provinces gained their independence from Spain, they possessed a burgeoning arms industry and trade that supplied foreign and domestic demand, and comprised one of the largest markets for mass-produced goods in the Republic.⁴ The central question is how Dutch merchant-entrepreneurs built up such an extensive sector of industry in such a short period of time, between 1585–1621.

It is only possible to understand the development of the arms industry in the Dutch Republic within the context of the Republic's development and evolution as a state. The years 1585–1621 witnessed an economic expansion and boom in trade, military reforms under prince Maurice, the state's bureaucratic and military institutions were constituted, and the young Republic consolidated itself. Therefore, during the period under discussion entrepreneurial conditions for the arms trade and arms production were influenced to a large degree by three important, interrelated processes of state formation: economic growth, state administration and war finances, and military reforms.⁵

Economic growth

Within the process of accelerated economic growth, the rapid expansion of long-distance trade and fishing constituted a phenomenon of particular note. Shipping to Guinea, the Mediterranean, the East and West Indies, whaling in the Arctic Ocean and cod fishing off Newfoundland were among the most flourishing sectors in the years 1590–1621. Dutch merchant-entrepreneurs successfully managed to tap into all kinds of new overseas markets. Privateering and trade not infrequently went hand in hand. Soaring prices for colonial products were a powerful driving force. They were caused by Spanish confiscations in 1585 and 1595, a trade embargo by the Spanish king and increased protection and transaction costs for trade on the Iberian Peninsula and Italy.

The entire process of expansion took place in a short period of time, with opportunities for entrepreneurs to operate in new markets occurring in rapid succession. To be able to respond to these new developments, it was necessary to be able to deploy ships relatively quickly and efficiently. This also applied to entrepreneurs in the arms business. They had to deliver weapons and ammunition regularly and within a short time frame. That was rather important. Lane and Glete already pointed out that protection costs played a major role. Therefore, armament costs made up a substantial portion of total equipment costs. Even more than with the existing trade in Northern and Northwestern Europe, long-distance trade required not only larger numbers but also large and well-armed ships.

Extremely important, the five Admiralties, who were tasked with supervising the creation and staffing of a fleet, although not generally pursuing a broad policy of support, vigorously subsidized the particularly risky long-distance trade especially in new operations. They did so both through direct deliveries of artillery and ammunition and financial support for their purchase as well as through the convoying and protection of merchant and fishing vessels. Squadrons crossed in all kinds of sea areas for this purpose. The equipage costs in equipping ships could be reduced by all this. By actively supporting trade and shipping, the Dutch state kept its finger on the pulse and played a strong innovative role.⁶

State administration and war finances

In the Dutch Republic a decentralised system developed for financing and sustaining the war against the Spanish Habsburg Empire. Two considerations are important. First, 80% of all state expenditures were war expenditures, and thus state administration, organised on three tiers, on a general 'national' level, and provincial and regional/city levels were concentrated on collecting revenues for

financing war and paying war-related debts. Second, there existed no separate roles between the public and a private sector. Narrow ties existed between the state authorities and entrepreneurs in trade, shipping and industry. The decentralised system for pay and supply of the army and navy formed the Republic's backbone. Together with members of the provinces, the Council of State regulated military and financial affairs in the Republic: an annual budget of war expenditures (*State of War*) accompanied by a general request in the assembly of the States-General for a contribution to the provinces (*General Petition*).

Each province had a set share (*quota*) in this annual budgeted war expenditure, depending on wealth and income for the next campaign season. The Provincial States and their deputies, who took care of the more day-to-day military and financial affairs, issued orders to the Receiver General and Receivers to pay the ordinary, specified war expenditures of companies of infantry and cavalry, officers' wages, ammunition and artillery, as well as expenditures on behalf of agents and ambassadors abroad and services of secret agents. Unexpected expenses, *extra-ordinary* war charges, were not immediately allocated to the provinces. In these cases, the States General had to consult the provinces on the allocation and distribution. The war fleet, decentralised in five admiralties (Amsterdam, Rotterdam, Zeeland, Noorderkwartier, Frisia), paid the majority of its expenses by the revenues of incoming and outgoing trade in their admiralty districts.

The Republic formed a voluntary alliance. In practice, therefore, the provinces were by no means eager to pay all expenses. In some cases, Friesland and Zeeland being examples, they refused to pay their full share of ordinary and extra-ordinary war expenses. As a result, the provinces were always running up larger or smaller arrears in their contributions. It constituted a structural problem. Funding basically constituted the Achilles' heel of the Republic. Fortunately, on the one hand, the wealthiest province of Holland contributed 58% of the war expenditures and via a stepped system of the Receiver-General of the States-General and Receiver-General of the State of Holland also the arrears and extraordinary payments were often covered by Holland. Consequently, the debts of Holland were far more than those of the generality or the other provinces combined. On the other hand, specialised merchant-entrepreneurs, the *solliciteurs-militair* and *solliciteurs* offered vast amounts of money in advance of later state payments to the captains and colonels of infantry companies, cavalry squadrons and regiments of the Dutch state army and captains of the Dutch navy. Furthermore, the Receiver-general of the States-General was fortunate to receive subsidies of tens of millions of guilders from England and France in the years 1585–1609 in accordance with alliances that paid for various expenses of the army and navy. Remarkably, these large flows of subsidies were taken care of by big merchant-entrepreneurs/financers that also operated in niches of the Dutch arms industry and trade.⁷

Military revolution

The broader context of the Dutch military reforms provides the link with increasing scales in army and navy and organisational innovations: the military revolution on land and at sea. First, there is the military revolution in land warfare as studied by Michael Roberts and Geoffrey Parker and many others: the rise of artillery and the *trace italienne* and the accelerated development of West-European armies in scale, firepower, tactical organisation and strategy in the 16th and 17th centuries.⁸ How did this development occur and why along these lines? What incentives do authors point to for this development? Tactical and organisational innovations led to greater discipline and firepower of the Dutch state army. Instruction books such as De Gheyn's *Wapenhandelinghe* (1609) and officers spread the message of the exercise of arms across Europe, in particular in Sweden. The Dutch Republic and Sweden for a time became pioneers of these reforms in Europe.

Second, between 1450 and 1650, a revolution in maritime warfare took place. Jan Glete, John F. Guilmartin Jr., Carlo Cipolla and Nicolas Rodger wrote extensive studies about this process.⁹ It was characterised by fundamental changes in types of shipping and naval equipment, armament, and applied tactics. Around 1500 ships of two types dominated trade and warfare at sea, the bullet ship and the square-sailed caravel, suitable for navigation on the Atlantic Ocean, and the galley with oars and Latin or triangular sails that could sail with extreme agility on the Mediterranean. From the intersection of the best sailing and navigational characteristics of the caravel and the galley, the galleon was born in Portugal and Spain in the mid-16th century. The galleon became the archetype for all long-range expeditions: it could master the Atlantic and Mediterranean seas, contained enough lasts to carry vast stores of water and food, had an efficient rigging and combination of masts, latin and square sails, and was armed with guns at the bow and aft, and many on both boards. It not only formed the basic platform for armed merchantmen as war ships but continued to develop further. At the end of the process, naval warfare was dominated in the second half of the 17th century by the so-called ship-of-the-line and the application of line-ahead tactics in long-range engagements. Both Parker and Guilmartin argue that the Dutch war fleet played an important role in this transformation process through its introduction of new ship types (frigate 1627) and the first application of these new line-ahead tactics (Battle of Duins 1639).¹⁰ In order to apply the tactical implications of these reforms, the soldiers gained distinctive expertise and means of education, for instance the drill instructions book of Jacob de Gheyn, and efficiency in execution of expertise, for instance trained guncrews on board of ships, and permanence, for instance the Dutch admiralties and their tasks. However, especially during a phase of expansion of the state army and fleet between 1588 and 1621, these tactics could not be applied,

and organisational improvements could not take-off if material conditions were not met by the supply side of the Dutch Republic.

Tactical and organisational reforms, standardisation, increasing scales

In the war against the Spanish-Habsburg forces, the military reforms of the Dutch army and war fleet between 1590 and 1621 were of crucial importance. Tactical and organisational innovation resulted in the transformation of the state army into a disciplined and regularly paid force, through increased firepower and better logistical support. These reforms ensured that the state army was well equipped for the attack and defence in three forms of engagements in land warfare: sieges, skirmishes, and battles. The main focus of this military transformation was the development (or rather rediscovery) of new infantry organisation and tactics that manifested itself in conversion and volley fire.¹¹ The battle orders featured a block of pikemen. The musketeers and arquebusiers would fire and turn right by ranks of five to six men and march in succession to the end of formation through gaps six feet wide between formations. The succeeding rank of five to six men could step forward and then fire a salvo and repeated the movement to the rear. Thus, a unit of infantrymen in ranks on line could deliver rapid fire.¹² At the same time, the soldier's weapons changed or were modified. For the foot soldier, the arquebus was replaced by the more efficient musket, though pikemen still comprised as many as one-third of most infantry formations.¹³

Standardisation of firearms, ammunition and siege-equipment and fortification materiel proved to be another important development. By distributing models of firearms, pikes, and the like, and molds and standard pliers for casting bullets from the central warehouse in Delft to the regional warehouses, and the prescribed use of standard sizes in arms, the Deputies of the State colleges were able to purchase standardised sets of arms and ammunition. Similarly, models of pickaxes, spades, axes, buckets, barrages, baskets for field fortifications, bridge parts, standard palisades and the like for sieges and fortifications were produced for the central warehouse of the generality and other warehouses in the provinces.¹⁴

However, of more importance was the increasing scale. The logistical organisation of the provinces and generality provided for the growing need of siege, bridging and fortification materiel for the fast growing state army. In order to meet the growing demand of the army, the authorities affected the arms industry through distributing regulations (repartition system), by sending standardised units of arms and equipment (models), and by prescribing regulations for guilds.¹⁵

This not only made the logistical system more efficient, but also fostered the integration of new companies into the state army. They were equipped with the same weapons as the older companies. It gave them the possibility to train them

quickly on new drills and tactics. It gave the units the same firepower, fighting power and made the formation of reserves possible and made it easier to build and train companies in larger formations. Standardised equipment also allowed trench systems, field fortifications, fortifications and army camps to be planned and set up more quickly and efficiently. Besides saving campaign time and logistical facilities, these innovations made siege campaigns more effective and increased the State army's chances of capturing even several towns or forts in a campaign season.

The Dutch Republic was confronted between 1585 and 1621 with a maritime challenge, as well. The growing number of Dutch trading vessels required additional naval escorts and the blockade of the Flemish coast required more provisions and more sailors. Increased naval assets were needed to attack enemy shipping, bases and islands in Spanish and Portuguese waters. Changes in weapons and tactics also presented the navy with challenges. A combination of short- and long-range weapons was considered essential. The increasing importance of cannon required heavier armament and another type of war ship. In particular, the number of heavier, long-range types per ship rose; these were more able to sink ships compared to the lighter anti-personnel, short-range cannon. Moreover, shipboard gun types became more standardised, while the number of medium and heavy ships of the Dutch admiralties increased. Within the shipbuilding sector, a process of standardisation came into being, in which the *jacht/yacht* and a new larger type of *spiegelschip/galleon*, acted as standard models for the new war fleet.¹⁶ These developments changed the Dutch war fleet into a better and more heavily armed force with greater firepower and enhanced logistical support.

Consequently, the new war fleet was just as capable of fighting at a distance as it was at close range. This fleet was equally equipped to conduct long-distance operations in the Atlantic as it was able to blockade the Flemish coast. Through the combination of increased firepower and new shipping types along the lines of the galleon, the Dutch took an important and decisive step in the gradual process of tactical transformation within Europe in the period 1450–1650, from ramming and boarding attacks to long-distance gunnery duels leading to boarding attacks. The beginnings of preliminary artillery duels with large artillery, antipersonnel artillery and then boarding are evident from Jacob van Heemskerck's Battle of Gibraltar in 1607, and the first line formations on successively firing from bow, port/starboard and stern in the 1620s with Piet Hein's tactics and Trump's line tactics at the Battle of Duins in 1639.¹⁷ In this, the Dutch played a leading role in Europe. The Dutch war fleet became a core force of specialised war ships, supplemented by hired and bought ships.¹⁸

The net-result of all of this was an enormous increase in the scale of war. Warfare changed as the number of sieges and long-distance operations at sea increased. Initially the growth of private enterprise also served the Republic's war aims. But the period shows that the State army and the State fleet both witnessed a marked increase in activity and radius. The army was involved in more sieges which in

turn required additional manpower, mostly garrison troops to hold captured towns and territories, a challenge which was solved in part through the use of militia in the rear to save professional soldiers. Likewise, the increase in the number of expeditions and the protection of the merchant fleet required greater numbers of sailors that could operate in European waters up to and including the Levant, Portugal, Spain, Baltic, etc. Beyond that, warfare in the Indian Ocean and Asia was outsourced to the East India trading company, whereas operations in the Atlantic were the remit of the West India Company, that also took to privateering. Naturally, the demand for war material grew with the increase in the number of troops and ships.¹⁹ Consequently, it became attractive for the Dutch Republic to found its own domestic production of war material. Both the standardisation of armaments, and the regular payment of wages and of war material created additional incentives for the growth of the arms industry.

Entrepreneurs and state authorities

As a link between demand and supply, the entrepreneurs were crucial. The multi-staged system of payments that the admiralties, the States-General and the States of Holland operated proved a vital link with the entrepreneurs. The increased demand stimulated trade and the production of war materials. It is clear that between politics and a small group of entrepreneurs a narrow cooperation developed, that proved to be profitable for both sides. The Dutch state authorities at local levels (provinces, towns, admiralties) removed several important bottlenecks for entrepreneurs: scarce and expensive raw materials, limited production capacity, scarce supply of skilled labour, endangered lines of supply by the enemy.²⁰

The measures they took entailed a regular supply of raw materials, diversification in the supply of raw materials, intensifying Dutch-Swedish relations that led to Dutch entrepreneurs producing arms in Sweden with immigrant craftsmen for export to the Dutch army and navy, offering a stable salesmarket by regular payments and by local merchants-officials-networks, and fostering an assembly industry.²¹

One of the most important activities was that the Dutch admiralties and provincial states supported the merchant-entrepreneurs by way of a regular supply of raw materials. They had enough fiscal revenues to create huge stocks of raw materials. This system of financing raw materials offered both parties major advantages. The manufacturers were no longer compelled to purchase raw materials on the market. This reduced entrepreneurial risks and lowered the costs of production and made the build-up of an arms industry possible. Maximum profits in the short term were exchanged for the build-up of more reliable relations with the government in the long term in order to optimise profits.

However, it was also very advantageous to the government. By stockpiling large quantities of saltpetre for gunpowder, for example, the Dutch government, army and admiralties were less affected by fluctuating market conditions, so in the end it was cheaper.²²

The sound supply of the state army and admiralties created a big store of standardised ordnance, equipment and warships. That store was deliberately used by the States-General and admiralties during the Twelve Years Truce to boost the Dutch expansion overseas. Subsidies in the form of warships, ordnance and equipment to the Dutch East India Company mounted up to 30% of the company costs of equipment. This grand scheme of support was repeated after the foundation of the Dutch West India Company in 1621.²³ Again, during three decades numerous warships and large quantities of armament and equipment heavily reduced the equipment costs of the company and their costs for maintaining troops overseas. The merchant marine involved in long distance trade was supported as well: every fourth man on an armed merchantman in the Mediterranean trade was subsidised and the admiralties loaned hundreds of guns and substantial quantities of ammunition and equipment.²⁴ The result was an increased continuity of the Dutch war effort and maritime expansion overseas. Moreover, this support, helped by standardisation, accelerated the arming and equipment of ships and made it possible for entrepreneurs to react quickly to changing market conditions, which, in turn, helped the Republic to hold its own against its rivals.

Conclusion

The Dutch state authorities took away bottlenecks for, and provided regular payment to, merchant-entrepreneurs in building up a Dutch arms industry that could meet the challenges of changes, standardisation and increasing scale of the supply of war materiel. In this way, the arms industry and military reforms on land and at sea created advantageous materiel conditions for an expanding army and navy and its increasing scales of operations and organisational innovations in the Dutch Republic during the Eighty Years War. The impact on the Dutch economy was even larger: the Dutch state, their reforms and standardisation not only increased the firepower on land or at sea, but also provided continuity, and possibilities for merchants to react quickly, in overseas trade and shipping.

Of course, conditions from the 17th century cannot easily be translated into policy advice of desirable courses of action. Nonetheless, it can be argued that the deep involvement of the developing state apparatus created the conditions both

for the Republic to survive and the entrepreneurs to flourish, and vice versa. By stockpiling raw materials and amassing funding, the state lay the framework for its survival, whereas standardisation guaranteed the quality of the weapons systems and their mass production. It is perhaps here that the past may offer inspiration to the present.

Notes

- ¹ For instance: Trachtenberg, *The Craft of International History*; On the Great Power Game and the Office of Net Assessment of the Pentagon: T.X. Hammes, paper Future of Warfare Conference, Amsterdam 7-9 October 2022.
- ² Now fighting on two fronts, moreover, the Spanish army suffered from arrears in payment due to failing Spanish war finances. Even mutinies increasingly obstructed various campaigns. Parker, *Spanish Road 1567–1659*, 231–247. Van Nimwegen, “*Deser Landen Crijchsvolck*”, 131–144. Groen, *Tachtigjarige Oorlog*, 221–235.
- ³ Parker, *Spanish Road*, 248–251. Van Nimwegen, “*Deser Landen Crijchsvolck*”, 144–170. Groen, *Tachtigjarige Oorlog*, 236–260.
- ⁴ De Jong, “*Staat van Oorlog*”, 337.
- ⁵ De Jong, “*Staat van Oorlog*”, 337–338.
- ⁶ For an overview of the rapid expansion of Dutch trade during the years 1590–1621: Israel, *Dutch primacy*, 80–120. De Jong, “*Staat van Oorlog*”, 341. Glete, *War and the state*, 100–116. Lane, *Profits from power*.
- ⁷ De Jong, “*Staat van Oorlog*”, 310–336, 347–349.
- ⁸ Roberts, *The military revolution*. Parker, *The military revolution*. Rogers ed., *The military revolution debate*.
- ⁹ Glete, *Warfare at sea, 1500–1650*. Guilmartin Jr., *Galleons and galleys*. Cipolla, *Guns, sails, and empires*, 75–89. Rodger, *The safeguard of the sea*, 204–220.
- ¹⁰ Parker, *The military revolution*, 83, 89, 90, 92, 99, 100; Guilmartin, *Galleons and galleys*, 158–164.
- ¹¹ Van Nimwegen, “*Deser Landen Crijchsvolck*”, 91–96.
- ¹² Van Nimwegen, “*Deser Landen Crijchsvolck*”, 97, 98.
- ¹³ De Jong, “*Staat van Oorlog*”, 32, 33, 339; Van Nimwegen, “*Deser Landen Crijchsvolck*”, 85.
- ¹⁴ De Jong, “*Staat van Oorlog*”, 35–42.
- ¹⁵ De Jong, “*Staat van Oorlog*”, 343.
- ¹⁶ Bruijn, *The Dutch Navy*, 20–23; De Jong, “*Staat van Oorlog*”, 340.
- ¹⁷ Guilmartin, *Galleons and galleys*, 191–205; De Jong, “*Staat van Oorlog*”, 55, 56, 63. Groen, *Tachtigjarige Oorlog*, 337–341.
- ¹⁸ De Jong, “*Staat van Oorlog*”, 64–70.
- ¹⁹ De Jong, “*Staat van Oorlog*”, 90–92, 124–126, 150–152.
- ²⁰ De Jong, “*Staat van Oorlog*”, 343–346.
- ²¹ De Jong, “*Staat van Oorlog*”, 343–346.
- ²² De Jong, “*Staat van Oorlog*”, 345.
- ²³ De Jong, “*Staat van Oorlog*”, 341, 342.
- ²⁴ De Jong, “*Staat van Oorlog*”, 114–122.

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“If fate should strike us with a new occupation...”. Dutch defence preparations, 1946–1949

Floribert Baudet

Abstract

From 1946 the Dutch government expected a new war to erupt in Europe. After the communist coup d'état in Prague (February 1948) and especially the Soviet imposed Berlin Blockade (June 1948) preparations were scaled up. An analysis of these preparations reveals the extent to which they were influenced by the brutal annexation of the Baltic States by the Soviet Union in 1940. I will argue that the assumptions underlying Dutch expectations of what an impending war with the Soviet Union would look like and the decisions based on them, were randomly picked even though they rang very true at the time. Paradoxically, these assumptions also impaired preparations and the scaling up of the defence effort.

Keywords: Defence preparations; Lessons learned; Cold War; Netherlands; Tunnel vision

Introduction

Amice, a very reliable Russian source that alerted me a fortnight ago, now warns that a serious turn of events, which will also involve the territory of the Netherlands, is imminent. I do not think I should fail to inform you in this regard..., wrote Frans Beelaerts van Blokland, the elderly vice-president of the Dutch Council of State to Minister of Foreign Affairs Pim van Boetzelaer on 26 June 1948.¹ At the height of the crisis sparked by the Soviet blockade of Berlin, the message sparked immediate alarm and Prime Minister Louis Beel conducted emergency talks with the Chief of the General Staff, Lieutenant General Hans Kruls.² While this second war scare within a few months came and went, the Berlin scare and the one in February, after the communist coup d'état in Prague, caused an intensification of the various initiatives that had been taken since 1946. Coordinating bodies were appointed, lacunae were identified, and feverish attempts were made to address them before the Soviet onslaught.³

Rather than discussing the wide range of measures that the Dutch took between 1945 and 1950 and detailing the way they were scaled up from 1948,⁴ the aim of this

chapter is to identify the underlying assumptions, concepts and inspiration and to dissect these ideas. Then, as today, policymakers and military planners saw a world order in shambles, and domestic and international concerns competing for precedence. While the past in itself does not offer clear-cut lessons, this chapter reveals the extent to which group think, and tunnel vision dominated Dutch thinking back then. While fear of Soviet intentions was understandable, expectations in the early Cold War of what war with the Soviet Union and the occupation that would inevitably follow it would look like, were primarily based upon the experience of the Baltic States in 1940 without ever providing a semblance of a credible argument as to why this would be the case. When the assumptions were challenged, policy-makers merely ignored the criticism.

Worse still, while intended to offer guidance and justification for a scaled-up preparation, the scenario, paradoxically, also impaired vital preparations. The chapter thus presents a mirror to today's policy makers (and scholars for that matter). Its purpose is to play the part of the devil's advocate. How can we be sure to do a better job today when we inevitably bring in our own threat perceptions, fears and preferences and look for confirmation?

Anatomy of defeat

On 15 May 1940, after only five days of fighting the Dutch armed forces surrendered. The fact that a great power had beaten a small one need not surprise us. Contemporaries, too, were primarily shocked at the swiftness of defeat and, as the war turned into an occupation, the apparent near-total lack of preparation on the part of the Dutch civilian and military authorities for such an eventuality. For fear of risking neutrality, consecutive pre-war governments had all but vetoed contact with the Western powers on such matters as military cooperation and evacuation. Vice Admiral Johan Furstner, the commander of the Dutch navy, had made a number of private arrangements and had managed to evacuate part of the fleet, personnel and a number of naval ensigns included, but the 240,000 strong army had not done so, which left the Netherlands armed forces in Britain in dire need of the manpower necessary to influence British (and later also American) decision making. The unpreparedness is perhaps best illustrated by the fact that Cabinet and Queen both left The Hague, but Cabinet ministers only found she was in London after they had reconvened there, too.⁵ The tens of thousands of civil servants that had remained in the Netherlands had received little instruction as to how to behave toward the occupiers, and quite often found themselves looked upon with suspicion and, at war's end, faced accusations of active collaboration with the Germans. So, in 1944–1945, when the Allies liberated the Netherlands and

Dutch authorities reasserted control, there was a widespread conviction that next time the Dutch would have to do much, much better.

As low morale rather than a lack of training or a lack of strategic depth was – erroneously – identified as the key factor explaining the defeat against Germany, the remedy seemed straightforward: improving morale and increasing resilience.⁶ There was a practical reason, too: with a view to reestablishing control in Indonesia (still under Japanese occupation), the government hoped to deploy ground forces to the war against Japan. To this end it engaged in a campaign to win over volunteers which developed into a massive but largely covert information campaign aimed at bolstering national resilience.⁷

The idea that next time the Dutch had to perform better also underlay the plans to rebuild the armed forces that were presented. The new Chief of the General Staff, Kruls, envisioned a seven-division army consisting of just over 200,000 highly trained and motivated men. They would on average be younger than their pre-1940 counterparts, and their training would have to be far more intensive and realistic than had been the case after World War I. Unlike its predecessor, the post-1945 army would have tanks and greater mobility. The air force, formally still a part of the army, but acting quite independently, would have to consist of some 500 planes, mostly fighters and light bombers. Under the guidance of Vice Admiral Johan Termijtelen, the navy, for its part, developed plans to construct four carrier groups, each centred around a light fleet carrier and containing two light cruisers, several destroyers and a number of auxiliary ships. Highly ambitious in itself, the fleet plan was considered only the beginning of the future fleet. Submarine construction was for the time being not resumed, and neither was the completion of two pocket-size battleships modelled on Germany's *Scharnhorst*, that had been interrupted during the war.

The proposed reconstruction of the Dutch armed forces faced a number of misfortunes, though. Even under the best of circumstances the Netherlands could not afford it. The cost would have been staggering without guaranteeing strategic autonomy. The Netherlands could not possibly hope to ward off an invasion by itself. Only an alliance could, as the branches (grudgingly, perhaps) admitted. Each of their plans contained references to combined operations with ‘the allies’, i.e., the British, even when the wartime alliance had formally disbanded, and the government embraced Roosevelt's *One World* concept.

Meanwhile, many policy makers and military planners in The Hague believed that the Netherlands could only hope to be a valuable partner if it could mobilise its full potential. After all, the ‘Dutch empire’ had seventy million inhabitants – about the same number as Germany or Japan – but recent history had shown it had been no match for either of these.⁸ Both the armed forces’ plans and this so-called “empire defence” were soon complicated by the Indonesian declaration of

independence. Rather than better integrating Indonesia in an empire-wide defence system, as the Dutch had intended, consecutive governments now felt a need for a large military build-up that would be able to crush the ‘rebellion’ and restore Dutch control by mid-1947. Had this been achieved, a commonwealth-like structure would replace the pre-war empire, as the Netherlands could, it was believed, not do without Indonesia; but throughout, the Dutch found it hard to understand that a large majority of Indonesians wanted *full* independence, not some dominion-like status.⁹ As tensions started to rise in Europe from 1946, deployment in Indonesia centred on small units and a brown water navy and thus moved away from the preferred force structure. Over time, and certainly by early 1948, many in the armed forces leadership, and especially Minister of the Navy and of War, Alexander Fiévez, had concluded that the war in the archipelago was a secondary front that drained valuable resources that were desperately needed in the Netherlands.¹⁰

One world: two blocs

At war’s end, in 1945, there had been some genuine hope that cooperation between the victors of the Second World War would be possible regardless of political systems. But these hopes were soon dashed. Still, consecutive governments preferred the UN system over the emerging division of Europe, as such a division would impair the possibility of economic recovery of both Germany and the Netherlands.¹¹ In June 1947, however, with bankruptcy approaching as a result of the war against Indonesia and facing considerable domestic economic hardship, the Netherlands welcomed Marshall Aid. The government was well aware that this meant joining an American-led bloc, but for the next seven months the Hague reiterated its support for a united Germany and its opposition to a division of Europe, that would impair economic recovery.¹²

As the international climate continued to deteriorate and talks on the future of Germany broke down in late 1947, the British and French decided on a formal alliance that by March 1948 also included Italy, the Netherlands, Belgium and Luxemburg. This marked the end of Dutch neutrality that had been the cornerstone of its security policy since around 1840. A key stimulus for giving up neutrality was the communist take-over in Czechoslovakia on 25 February. “Prague” served as a forceful warning of the risk of allowing domestic communists near the reins of power. As the Dutch communists in parliament applauded the coup, a parliamentary majority moved to prevent their access to sensitive information and barred their membership of several key parliamentary committees. In view of the deployment of the regular armed forces in Indonesia and with a view to pre-empting the resuscitation of right-wing vigilantism that had manifested itself in the aftermath

of World War I, government decided to create the National Reserve, an auxiliary volunteer army, and an auxiliary border police.¹³

'... there will presumably be no liberation'

After 1945, the Netherlands refused to engage in talks on a formal alliance, but so did its prospective allies. It did, however, decide on preparing evacuation plans for Queen and Cabinet as there were too few Dutch *or* allied troops available to slow down an attack. It deeply mistrusted Soviet intentions and strongly opposed the communist ideology, as did the vast majority of the Dutch. The government did not think, however, that war was imminent.¹⁴

By Spring 1948, however, what had seemed a distant possibility in 1946 had become a life-size threat. Over 75 per cent of respondents in a poll that the Dutch government had secretly ordered, expected a new world war to break out in the next five years and believed that the Soviets would start it.¹⁵ Similar fears dominated elsewhere in Western Europe. In early April, Louis de Jong, the director of the Netherlands Institute of War Documentation, sent a white paper to Prime Minister Louis Beel urging him to initiate a specific number of precautionary measures against a surprise attack by air and land and supported by domestic communists.¹⁶ Beel inquired with Louis Einthoven, the boss of the Internal Security Service, who replied that he was impressed with De Jong's analysis. He was happy to announce, though, that most of the measures De Jong urged were already being prepared.¹⁷ De Jong was then invited to write an additional memo that specifically focused on the occupation of the Baltic states in 1940, which was distributed to Beel, the Foreign Ministry, the General Staff and others. Although there was no 'formal' adoption, from about mid-June 1948 this formed the basis of Dutch thinking.¹⁸

Regardless of Einthoven's reassurances, Beel's successor as Prime Minister, Willem Drees, felt that preparations should be scaled up and installed a top-secret committee consisting of key players in the Dutch security sector that soon went by the moniker of *Jansen* (after the most common Dutch surname). *Jansen* was to coordinate the 'non-military' aspects of the looming war. After a preliminary report in late September the committee sent its recommendations in early November. Its analysis largely followed De Jong's.¹⁹ For *Jansen*, it was crystal clear that the Soviet Union would attack unannounced. Weeks of apparent calm could precede a surprise attack, but it could also be that the Russians would suddenly increase tension and then launch an attack to exploit it. Paratroopers would be dropped at strategically and tactically important points such as airports, bridges and perhaps also the government centre of The Hague. 'Dissatisfied' elements of Dutch society – local communists, discontent people and members of various minority

groups²⁰ – would also be involved in the first phase of the offensive; they would sow confusion, spread disinformation and also actively contribute to the Soviet advance by occupying bridges and the like. If these were secured, a rapid advance of Soviet ground troops was guaranteed. Some of these troops would be flown in, others would have advanced through the North German Plain and at some point, sweep across the Dutch borders. There might be some Dutch successes, but given the great disparity of forces, the expected ruthlessness of the Soviets, who were ‘not inhibited (...) by considerations of humanity, morality, international law, world opinion, etc.’ and ‘driven by the easterner’s penchant for cruelty’, defeat and occupation would be a matter of hours, well before allied forces would be able to provide any measure of relief.²¹ As the Western Union was still in its infancy and the American troops in Germany were too few in number, defeat was thus inevitable and once Soviet power had been established, the occupier would immediately start deporting the intelligentsia, the country’s political, cultural and intellectual elite. Not only was their individual survival at stake, though: it was conceivable the Soviets would exterminate the entire Dutch nation.²² In short, ‘If fate should strike us with a new occupation, there would presumably be no liberation’, as one influential military writer summarised these fears somewhat later.²³

‘Stabilising the guilder to hand it to the Soviets?’

In the 1946–1948 period this very dismal general scenario underlay a number of detailed plans some of which were briefly discussed above, and inspired alertness to a strategic surprise. It also fuelled discussion about priorities: if anything was to come from these increasingly ambitious plans, the Dutch military, and in fact the entire Dutch population, needed to be able to buy time and hold off the Soviets longer than mere hours. Reinforcing defence spending seemed a logical response.

This was not without risk, however. Not only did the government already spend large amounts of money on the increasingly unpopular war in Indonesia, but the defence budget was also consuming a substantial share of the total budget as it stood. Whereas the military primarily feared an outside attack and demanded more funding for a build-up that would make the Netherlands’ armed forces either a credible ally or a credible deterrent, government’s key concern was the attraction of the communist ideology. In the 1946 general election over 10 per cent of the electorate had voted communist. Poor living standards and divisions over the wisdom to deny the Indonesians the freedom the Dutch themselves had craved during the German occupation, led to fears that a communist take-over could become a reality. The Government hesitated to grant extra funding to the military for fear that the fledgling Dutch economy could not sustain it; such expenditure would further erode living standards and serve the

communists' interests, and pave the way for a take-over, either with or without direct Soviet military aid, as was the fear in other countries as well. Most Western politicians firmly believed that, as in the 1930s, poverty bred support for political radicalism and thus suited the Soviet Union's interests.²⁴ To them, "Prague" proved they were correct. Government and the armed forces leadership frequently clashed over this. Economic recovery was the prerequisite for a military build-up, but the government was unable to convince the military that this was the case. In the words of the then Secretary-General of the Department of the Navy, a former naval officer, the government aimed to stabilise the guilder (the contemporary Dutch currency, FHB) in order to hand it over to the Soviets.²⁵

The financial constraints stimulated infighting between the army, the air force, and the navy, with the army arguing that funding a fleet when it was evident that the army should be strengthened, was suicide and the navy arguing that only the navy and the air force would be able to continue a war from abroad, a sentiment that as recently as 1945 had also been shared by the army leadership.²⁶ The government proved willing to consider abolishing the fleet, releasing funds for the strengthening of the army and air force, but the Dutch parliament indicated it would not support such a move at which the idea was tacitly shelved.

Feverish action

Still, in the planning for the looming war the initial focus was indeed on improving the plans for evacuation of key assets. Now not only were the royal family and the country's gold reserve to be evacuated, but also members of the political, economic and cultural elites. This would safeguard the survival of the Dutch nation, even in prolonged exile. In the same period a proposal was on the table to pre-emptively deport potential and suspected members of the Fifth Column to the overseas Dutch territory of Surinam. Its authors suggested that when this should not be feasible due to time constraints or even logistics, such persons ought to be shot on sight.²⁷

The plans also envisaged the compulsory evacuation of at least two army divisions worth of conscripts. This however did not sit well with the very limited time frame that would be available to put them into effect. Evacuating over 35,000 people would take far longer than the mere hours the scenario deemed feasible.²⁸ Worse still, the forces needed to carry out the evacuation and order refugees that were not on the evacuation lists to return to their homes, would also be needed to slow down the Soviet advance or intercept airborne troops. Thirdly, for fear of causing a panic, preparations would have to be made with the utmost secrecy, which in turn meant that chances were slim that people knew they were on the evacuation lists that were to be kept in a vault in each commune's town hall. The

scenario assumed that when the attack came, most of the Netherlands had to be given up without a fight. Planners expected apocalyptic scenes full of chaos and panic when the Soviets arrived. Soon it was decided to downscale the evacuation plans considerably and the projected evacuation of two divisions worth of conscripts was dropped. Getting them out in time was impossible, and, untrained as they were, their military value was as yet negligible.

Other plans went through as intended, though, such as the construction of an underground government site in a forest just south of the town of Delft, and the creation of a communications network that would either serve the government or help resistance movements. Lastly, much thought was given to instructions and moral guidelines that would be given to civil servants in the increasingly likely event of an occupation, something that had been lacking in 1940.²⁹ Armed resistance by civilians was also on the table. Some of *Jansen's* members deemed the *military* value of such groups quite questionable, but others believed they would be able to deny the Soviets the use of parts of the Dutch territory and specific military assets within it. While its symbolical value was widely acknowledged, armed resistance would invite harsh reprisals and thus perhaps be counterproductive in the long run. In the end, *Jansen* agreed that agents were to be designated and secretly trained, which would overcome a key concern stemming from the German occupation when the Dutch government in exile had had little control over the various resistance groups. Stocks were also piled, and secret arms depots were filled.³⁰

Furthermore, government and the military agreed that intensive psychological preparation of both the armed forces and the population at large was urgently needed. War could come at any moment, but a war scare was to be prevented. Propaganda played into fear of communism, but far more so on what was presented as the key characteristic of Western societies, the respect for the rule of law and the rights of man. This reflected a firm belief that 'positive' propaganda would actually be more effective than further instilling fear, which after all, could paralyse the population. Soldiers that were defending human rights and spiritual freedom would fight better while a society that valued these notions would be willing to fund such armed forces even if this meant suffering economic hardship. As one commentator wrote, human rights were 'the ideological equivalent of the atomic bomb'.³¹ But policy makers and armed forces understood that this, too, would be a mid-to-long-term development.

In the short run, increasing the morale of Dutch soldiers was one of the few things that actually *could* be done in Europe. This understanding led to an increase in propaganda efforts and to feverish attempts to close the perceived gap between armed forces and society. Only when Dutch society would squarely support its armed forces and value its achievements, would it be willing to fund its build-up and perhaps suffer economic hardship for it. It was only then that the Netherlands,

in close cooperation with its NATO allies, could hope to escape the gloomy prospect of Sovietisation.³² To bolster morale and increase resilience, the government also set up the *Bescherming Bevolking* (BB). Initially, the BB, a crisis response team, was expected to help overcome the disruptive effects of aerial bombardment, but it was soon called upon to advise the population on how to behave during a nuclear war and what to do against radiation. The organisation was a partial success. In its first months, it *did* attract considerable numbers of volunteers, but after the first hydrogen bomb test in 1953, few people believed anything *could* be done against a nuclear attack and the BB was soon ridiculed for suggesting otherwise. Still, it can be argued that the organisation contributed to deterrence as it suggested that the Netherlands, like its NATO allies, was prepared to even risk a nuclear winter in defence of its freedom.³³

A flawed analysis

The scenario outlined above looks quite coherent and was based on a number of assumptions that seemed logical and coherent at the time. In reality, though, it was based on a number of inaccuracies, or just plain errors, and wishful thinking. As said, it was inspired by the Baltic experience of 1940–1941.³⁴ The Baltic states had been pressurised into signing mutual defence pacts that allowed the Soviet Union to deploy troops in the wake of the Molotov Ribbentrop Pact of 23 August 1939. At the height of the Battle of France, in June, 1940, Moscow claimed that the governments of the Baltic states had violated these agreements and proceeded to occupy the region. After conducting fake elections, new pro-Moscow governments were formed that then formally applied for membership of the Soviet Union, which of course was accepted. The region was then thoroughly Sovietised and tens of thousands of people were killed or deported in the process, intellectuals, politicians, business leaders but also ordinary Lithuanians, Estonians and Latvians – a heinous crime that was repeated when the Red Army returned in 1944–1945. Despite ruthless persecution, post-war resistance groups would hold out until 1952 in Lithuania and Estonia, and 1957 in Latvia, but militarily they were a nuisance at best.³⁵

Plausible as it seemed, by adopting this scenario the Netherlands severely reduced its options: if the Soviet occupation started just hours after the war had started, there was very little time to do anything meaningful at all. This is remarkable as none of the plans explicitly offers a rationale as to why the Netherlands would suffer the same fate as the Baltics. In view of the fact that by 1948 the Soviet Union had applied several different models to control its neighbours, this is a grave omission. There generally was little reason to envy the populations in East Central Europe in the immediate post-war period, but there was no Soviet master plan; the Soviets

annexed the Baltic region and considerable stretches of Poland, Czechoslovakia and Romania, but they like the other satellite states retained their formal independence, and the 1948 coup in Prague was a domestic affair. Yugoslavia was expelled from the Cominform, the community of Soviet allies and subordinates, yet it managed to retain full independence and keep its own variety of communist rule, while Finland was proverbially Finlandised, giving Moscow a say in the country's foreign policy but leaving it to the Finns themselves to decide on domestic policies.³⁶ Each of these other possibilities is strikingly absent in Dutch planning.

Interestingly enough, when the scenario was distributed among Dutch diplomatic representations in East Central Europe, the diplomats' criticism was directed primarily toward *Jansen's* (and *De Jong's*) fixation on the Baltic parallel.³⁷ But nothing was done to fundamentally rethink the plan's underlying assumptions. The Baltic parallel was selectively applied, too. The Baltic states had been forced to accept a Soviet military presence which then proceeded to take full control. In the Dutch scenario these first stages were conveniently ignored even though in the Baltic states they had been essential for the eventual outcome.

How, then, should we explain its popularity? A few considerations come to mind. Given the deep-rooted disgust of all things Soviet, a pervasive sentiment in the pre-1940 Netherlands, it is not surprising that the Dutch worst-case scenario was based on some of the worst examples of Soviet behaviour.³⁸ Second, a focus on worst-case scenarios is a central and often defining element in all preparations for future war, even though the materialisation of the worst case may in fact be completely unlikely. It seems that these two explanations mutually reinforced each other. In spring and early summer of 1948, rumours of impending coups and invasion abounded throughout Western Europe³⁹ and it is conceivable this is also reflected in the scenario.

But there is another factor to take into account. In a rather cynical sense, the Baltic example made the Netherlands look good: apparently the Soviets would feel compelled to treat the Dutch in the same way. Singling out the Dutch for the harshest treatment only made sense when, in fact, the Dutch had either actively fought the previous oppressor or had taken up arms in support of its policies. In the former the freedom-loving sentiment among the population was such that it needed to be fully eradicated through mass deportations and executions, whereas in the latter situation a case could be made about the need to thoroughly denazify the Netherlands.

It is here that the model is applied inconsistently: while the fact that thousands of young Dutch males had volunteered for service in the SS and, generally speaking, the Dutch civil service and police loyally carried out whatever orders the Germans had given them was quickly forgotten, this fact would have "justified" Soviet-style denazification. Unsurprisingly, Dutch planners clung to the myth that the freedom-loving

nature of the Dutch made them such natural enemies of an occupying power, that the Soviets – being Soviets and as Asians cruel by nature – – they would then resort to the worst examples of state terror to suppress opposition.⁴⁰ What is surprising and somewhat at odds with the logic of the scenario, is that the same planners devoted much thought to the instructions the civil service would have to receive from the government-in-exile in case the country were occupied again.

Jansen and other Dutch planners also assumed that a Fifth Column would substantially aid the Soviets. This reflected ideas about what had happened in May 1940 when Germany had occupied the Netherlands. Back then, in those confusing days, rumours that the German *Wehrmacht* had received widespread help from disloyal elements from the local Dutch population had abounded, if only because they seemed to satisfactorily explain the swift collapse of the Dutch armed forces.⁴¹ In reality, Dutch defences collapsed in less than five days because the military had been poorly trained and because neutrality had precluded the possibility of organising effective outside help before the start of hostilities.⁴² Thorough research into the presence and effectiveness of a Fifth Column was only conducted in 1953 and offered decisive proof that its impact had in fact been negligible. In a twist of irony, its author was the same Louis de Jong that in 1948 had written the memo that stimulated planning for the next occupation and gave academic credence to the idea that a substantial Fifth Column had been at work in 1940 and that a new one would (therefore) be in the wings to help the Soviets.⁴³

To De Jong's and *Jansen's* credit, such beliefs were still widespread in the immediate post-war period and they were slow to subside, especially so when the fears of a recurrence of the events of 1940 were reinforced (and no doubt encouraged) when, in February 1948, during debates over the Prague Coup, the leadership of the Dutch Communist Party announced its intention to welcome the Soviets.⁴⁴

In the final analysis, then, it is not so much the thought that a Fifth Column would help the Soviets establish their rule that is appalling, it was the groups singled out for this role: 'Communists, disaffected, minorities, Jews, etc.'⁴⁵ That we encounter such ideas in Dutch scenarios suggests that these groups were still not considered an integral let alone loyal part of the Dutch nation. In fact, the implied natural connection between communism and Jewish identity echoed Nazi propaganda that had actively promoted this notion, but the Nazis surely did not invent it. It had been quite popular with Conservatives in large parts of Europe.⁴⁶ Equally appalling is the racist conviction that the Soviets were a worse enemy than the Nazis because they supposedly were Asian and therefore cruel by natural inclination. All this thinking about a future occupation should therefore be understood primarily to be a reflection of the traumatic process of coming to terms with a past occupation.

Interestingly enough, an alternate scenario *had* been formulated. This, however, was deliberately side-lined. In 1947, as the Netherlands was on the verge

of bankruptcy, the Minister of War installed the Penders Committee to identify possible cut-backs. Penders and his associates reviewed all the plans the military had produced since 1944, both their ambitious reconstruction plans and those dealing with a future European war. For our analysis it is noteworthy that they heavily criticised these plans, and argued that they were based on the erroneous assumption that the next war would look anything like the previous one. What had happened to the Netherlands in 1940–1945 offered no clue whatsoever as to what would befall the country in the next war. In fact, the Penders Committee held that the Netherlands would *not* be occupied. Should the Soviets occupy the country after all, the Dutch should however be prepared to deny them the use of whatever military assets the Netherlands had, rather than spending millions of guilders for a build-up that in view of the limited available time and funds would be unable to prevent a new occupation. What was needed instead was an excellent and robust communications infrastructure, and the training of couriers and the like that would help resistance efforts against the occupiers. In short, Penders advocated a whole-of-society approach to security.⁴⁷ The Penders Committee's only task was to identify potential cut-backs and this goes a long way to explaining why its view that the Netherlands would not be occupied and that government investment in the military would in fact be a waste of money and effort, was met with considerable hostility from the military authorities. But his argument deserved more credit than it was given.

Epilogue

After 1940, the Dutch understandably feared a reprisal of the swift defeat at the hands of the Germans. The scenario that underlay most planning after the war was based on the assumption that war with the Soviet Union was imminent and that occupation (and mass deportations) would follow within hours. From the fact that both the Penders Committee's criticism and the pertinent comments by Dutch diplomats in Eastern Europe did not lead to a fundamental rethinking of the scenario, it can be concluded that it was to a large part inspired by tunnel vision and group think. This, in turn, can be related to the dominant anti-communism and the military's penchant to consider not merely the 'most likely', but especially the 'most dangerous' course of events. It also was attractive because somehow it made the Dutch look good. Seen from this perspective, *Jansen* and the General Staff fell victim to a key tenet in the MoD's post-war strategic communication, i.e., that the 1940 defeat was a one-off event and that the near-universal resistance against the German occupier was proof that the Dutch *were* resilient after all. Past experience, wishful thinking and even preferences thus underlay the first post-war Dutch scenario.

What, then, does this historical case study suggest for the present? There is no inherent reason why today’s policymakers and military planners would do a better job than their historical counterparts. After all, then as now, the scenarios we develop invariably derive from past experiences. These form the frame of reference for the thinking and actions of decision-makers in the present; every person is a product of their upbringing and of their experiences. The dreaded future course of events, like the desired future course of events, is thus based on the extrapolation of these past experiences. There is no other way.

The key question however is which historical experiences and analogies are to be considered authoritative and on what basis, and who are to decide on that. In the 1946–1949 period, the Baltic scenario was but one possibility, and while it was certainly the most dangerous option, it is doubtful that it ever was the most likely. The Baltic scenario left planners precious little time to scale-up preparations for war and occupation and triggered debate about the wisdom of military spending. This is not to argue we ought to stop thinking about the future, far from it, but today’s policymakers and military planners should be more cautious about foresight, and more explicit about their assumptions and preferences. It’s only then that the risks of groupthink and tunnel vision can be mitigated.

Notes

- ¹ Nationaal Archief (hereinafter: NA), 2.03.01, inventory number 1467, Frans Beelaerts van Blokland to Foreign Minister Pim baron Van Boetzelaer van Oosterhout, 26 June 1948.
- ² NA, 2.03.01, inventory number 1467, undated note, Prime Minister Louis Beel [26 June 1948].
- ³ See Baudet, *Vierde Wapen*.
- ⁴ For a recent overview see Sanders and Baudet, “Civiele verdediging en civiel-militaire interactie” (in press).
- ⁵ De Jong, *Koninkrijk der Nederlanden*, Fasseur: *Krijgshaftig in een vormeloze jas*, Fasseur, *Sterker door strijd*, Fasseur, *Een dame van ijzer*; Aalders, *Wilhelmina*, Riemens “*Majesteit. U kent het werkelijke leven niet*”; Van Gent, *Adriaan Dijkhoorn, minister van Defensie in oorlogstijd*.
- ⁶ Amersfoort and Kamphuis, *May 1940*, 48 and 55; Baudet, *Het vierde wapen*, 48–51.
- ⁷ Baudet, *Het vierde wapen*, 59–82.
- ⁸ For the initial plan, see NA, 2.12.19 inv.nr. 27, note on the reorganisation of the Defence organisation of the Kingdom of the Netherlands, drafted by the Dutch staff element with South East Asia Command to BDZ/Oost M/461, 26 October 1945.
- ⁹ Much has been written on Dutch ideas about Indonesia. See H. Burgers, *De Garoeda en de Ooievaar. Indonesië van kolonie tot nationale staat*; P. Groen et al., *Krijgsgeweld en kolonie. Opkomst en ondergang van Nederland als koloniale mogendheid*.
- ¹⁰ See for instance: NA, 2.13.109, inventory number 2, minutes of the meeting of the Admiralty, 10 March 1948.
- ¹¹ Hellema, *Buitenlandse politiek van Nederland*, 113–125; Kruizinga, “A small state?”, 429–432; Daalder, “Nederland en de wereld, 1940–1945”, 188–190.

- ¹² Mallinson, *From neutrality to commitment*, 8–11, 33 and 38–44; Brouwer and Megens, “Het debat in de Ministerraad over de Nederlandse militaire bijdrage aan de NAVO, 1949–1951”, 486–487; Erlandsson, *Window of opportunity*, 354–255. For the United States’ motives behind offering Marshall Aid, see Ellwood, *Rebuilding Europe*, Dinan, *Europe recast*, 20–21, Behrman, *The most noble adventure*, and Lundestad, *The United States and Western Europe*.
- ¹³ Hoffenaar and Schoenmaker, *Met de blik naar het oosten*, 42–43; De Weger, *Binnenlandse veiligheidsstaken van de Nederlandse krijgsmacht*, 115–131; Hoffenaar and Schoenmakers, *De Nationale Reserve 1948–1998*.
- ¹⁴ Hijzen, *Vijandbeelden*, 104–105.
- ¹⁵ Van den Boom, *Bescherming bevolking*, 8.
- ¹⁶ NA, 2.03.01, inventory number 11636, memorandum L. de Jong, “Lessen uit de Duitse besetting” [“lessons from the German occupation”], presented to Prime Minister Louis Beel, 8 April 1948, and a subsequent memorandum “Russische politieke tactiek in Oost-Europa” [“Russian political tactics in Eastern Europe”], also presented to Beel, 15 June 1948.
- ¹⁷ NA, 2.03.01, inventory number 11636, Louis Einthoven (chief of the Internal Security Service) to Prime Minister Beel, 22 April 1948.
- ¹⁸ Witness NA, 2.03.01, inventory number 3012, directorate Political Affairs Ministry of Foreign Affairs to embassies in Eastern Europe, 77465-6348-GS, 16 July 1948, and NA, 2.03.01 inventory number 11636, letter J.H. Droste, deputy chief of the General Staff, to Prime Minister Beel, 24 July 1948.
- ¹⁹ NA, 2.03.01, inventory number 3012, report on Eastern Europe and what to expect, Secretary-General Cees Fock of the Ministry of General Affairs to Prime Minister Drees, 123307-10188 GS, 9 November 1948.
- ²⁰ NA, 2.03.01, inventory number. 11636, note for Fock pertaining the installation of the Committee “Preparations”, later called “*Jansen*”, September 1948.
- ²¹ NA, 2.03.01, inventory number 11636, preliminary report of the *Jansen* committee presented to Prime Minister Willem Drees, 28 September 1948. Cf. Van den Boom, *Bescherming Bevolking*, p. 27.
- ²² NA, 2.03.01, inventory number 11636, preliminary report of the *Jansen* committee, 28 September 1948. Compare the note drafted for Secretary-General Fock on the installation of the *Jansen* committee, [undated] September 1948, in idem.
- ²³ Koning, “Mei 1940–1945–1955–1965”, 207.
- ²⁴ Cf. Judt, *Postwar*; Gilbert, *Cold War Europe*; Black, *Military strategy*, 220–221; Giesen, *Land van lafaards?*, 215. Compare also Brouwer and Van der Heiden, *Drees. Minister-president 1948–1958*, 85. See, lastly, Hijzen, *Vijandbeelden*, 104–105.
- ²⁵ NA, 2.13.109, inventory number 2, minutes of the Admiralty, 13 October 1948. Compare De Geus, *Staatsbelang en krijgsmacht. De Nederlandse defensie tijdens de Koude Oorlog*; Drees, *Op de kentering*, 82, 97; Brouwer and Van der Heiden, *Drees*, 85; for views current within the armed forces: Hoffenaar and Schoenmaker, *Met de blik naar het Oosten*; Schoonoord, *Pugno pro patria*, 13 and 35, and Van der Vegt, *Take-off*, 59. See also Black, *Military strategy*, 220–221, which characterised the build-up of the welfare state as the ‘typical answer’ in Western Europe to keep the working class away from communism. It is noteworthy that within the army leadership too there were some that suggested improving social justice as a means to bolster resilience, but they formed a minority. NA, 2.03.01 inventory number 11636, letter J.H. Droste, deputy chief of the General Staff, to Prime Minister Beel, 24 July 1948.
- ²⁶ Notably NA, 2.13.147, inventory number 14, acting Chief of Staff Adriaan Dijkhoorn to Minister of War, Jo Meynen, no. 7 ZG, 8 August 1945. Cf. Traa, *De Russen komen* and Baudet, *Vierde wapen*, 87.
- ²⁷ Compare Van der Boom, *Bescherming Bevolking*, 29. To his credit, PM Drees refused to go along with the suggestion to order extrajudicial killings of potential opponents of the democratic order:

- "This is out of the question", NA, 2.03.01, inventory number 5111, reaction PM Willem Drees to the preliminary report of the Commission "Preparations" (later: *Jansen*), 29 September 1948.
- ²⁸ See also Traa, *De Russen komen*.
- ²⁹ These documents can be found in NA, 2.03.01, inventory numbers 5111 and 11636. It is beyond the scope of this chapter to outline the details of the discussions.
- ³⁰ Various reports in NA, 2.03.01, inventory number 11636. See also Engelen, *De Militaire inlichtingendiensten*.
- ³¹ Baudet, "The ideological equivalent of the atomic bomb", 269–281.
- ³² Baudet, *Het Vierde Wapen*, 209–212.
- ³³ Van der Boom's *Atoomgevaar? Dan zeker BB! Een geschiedenis van de Bescherming Bevolking* is highly critical of this organisation, as it measures that *could* deny the Soviets the gains of an atomic war were feasible. Matthew Grant's book on Great Britain, *After the Bomb* points out that it was impossible for Britain to secure enough funds for the construction of nuclear shelters and stockpiling of canned food for the entire British population or even a substantial part of it. This did not lead to the decision to cancel Civil Defence altogether. It was maintained to show that Britain was convinced there was life after an atomic war, which it was believed contributed to deterrence.
- ³⁴ See for instance NA, 2.03.01, inventory number 3012, directorate Political Affairs Ministry of Foreign Affairs to embassies in Eastern Europe, 77465-6348-GS, 16 July 1948 and NA, 2.03.01, inventory number 3012, "report on Eastern Europe and what to expect", Secretary-General Fock to Prime Minister Drees, 123307-10188 GS, 9 November 1948.
- ³⁵ Kaszeta, *The forest brotherhood*; Gehler and D. Schriffl, *Violent resistance from the Baltics to Central, Eastern and South Eastern Europe, 1944–1956*; Snyder, *Bloodlands. Europe between Hitler and Stalin*.
- ³⁶ Latyshev, "Almost Soviet: Integration of the Liberated Territories of the USSR, 1942–1944"; Hoffmann, *Europe, 1943–1947*; Caşu, "Moldova under the Soviet Communist Regime"; Wnuk and Loew, "Inszenierte Revolution"; Tismaneanu, *Stalinism revisited*; Wettig, *Stalin and the Cold War in Europe*.
- ³⁷ The reports are compiled in NA, 2.03.01, inventory number 3012.
- ³⁸ Compare Hijzen, "The perpetual adversary", 166–199.
- ³⁹ Gilbert, *Cold War Europe*, 64–65.
- ⁴⁰ NA, 2.03.01, inventory number 11636, preliminary report by the *Jansen* committee, 28 September 1948. Cf. Van den Boom, *Bescherming Bevolking*, 27; Van Roekel, *Nederlandse vrijwilligers in de Waffen SS*; Pierik, *Nederlandse vrijwilligers*; Berkhoff, "Het Oostfront en de Hollanders", 184–194.
- ⁴¹ Giesen, *Land van lafaards?*, 215.
- ⁴² Amersfoort and Kamphuis, *May 1940*, 48 and 55.
- ⁴³ De Jong, *De Duitse Vijfde Colonne in de Tweede Wereldoorlog*. On De Jong, see Smits, *Loe de Jong*.
- ⁴⁴ Verrips, *De geschiedenis van de CPN*, 259.
- ⁴⁵ NA, 2.03.01, inventory number 11636, memo for Fock on the installation of the *Jansen* committee, September 1948.
- ⁴⁶ Jones, *The German right in the Weimar Republic*; De Jong, *Koninkrijk*, part I, 153–154, 595–596; Braber, *Integration and Jewish resistance in the Netherlands*, 23 ff.
- ⁴⁷ NA, 2.13.147, inventory number 35, Penders Committee proposal for the reorganisation of the Dutch General Staff, 7 July 1947.

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The Cold War ‘life jacket’: The scalable armed forces of the Netherlands – a historical perspective

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Abstract

Growing global political and military tensions, particularly in the Eastern part of Europe, have caused NATO countries to reflect on the size and capacity of their militaries to defend NATO’s eastern flank and secure national sectors. So too in the Netherlands. This has been accompanied by renewed interest in historical comparisons, especially of the Cold War era. Therefore, this chapter explores the character of the Dutch conscript-reliant scalable armed forces of the Cold War, particularly the Royal Netherlands Army. It also engages with the main factors influencing the force’s (scalable) character, and analyses its military purpose and technical implementation, including civil-military cooperation. The chapter ends with reflections for current policy based on similarities and differences regarding the Cold War period, and uses the Cold War picture to better inform current Dutch policies.

Keywords: Cold war; Conscription; Compulsory service; Crisis preparation; Mobilisation

Introduction

The growing political and military tensions in the world, and particularly in Eastern Europe, have resulted in fundamental reflections in NATO countries over the size and character of their militaries. This is accompanied by renewed interest in historical examples and lessons, particularly from the Cold War era, as this was the last period in which European states had large, scalable forces to confront the adversary in the east. This is certainly true for the Netherlands, which has had a tradition of scalable armed forces since the founding of the Kingdom of the Netherlands, 210 years ago.¹ Particularly the army (land force) was composed of a core of professional military personnel and conscripts in active service; in times of crisis, this standing force could be supplemented – inflated like a life jacket, as it was often called – with a variety of previously trained conscripts.² The navy, and since the 20th century, the air forces worked with models less reliant on scalability but still also built a pool of inactive personnel to bolster their forces. These services,

too, prepared a range of measures to be taken in times of crisis. For the entire Dutch military establishment up until the end of the Cold War, the process of mobilisation was prepared in intricate procedures, scripts and timetables, which were – ideally – continually revised and practiced. The goal of executing an orderly transition from peacetime organisation to rapid deployment and readiness for grand scale warfare required major investments, preparations, discipline and cooperation with a range of civil public institutions and private organisations.

Clearly, policymakers – military and civil – will find that the history of the Cold War era offers plenty of insights to take inspiration from for the current Dutch debate over force size, scalability and conscription. At the same time, it is important to remember the specific context of the Cold War era and refrain from idealising or stereotyping this recent history.

Therefore, in this chapter, we outline and characterise the preparations for the upscaling of the Dutch forces – particularly mobilisation measures – from the NATO-wide alarm systems down to the specific mobilisation telegrams. More fundamentally, we also consider the relation between the Dutch military's structure as a scalable force, and the underlying strategic and societal considerations during the Cold War period. In doing so, the chapter first focuses on the strategic and societal context and the politico-military goals underlying the force's scalability and mobilisation procedures. It then delves into the structure and relationship between the 'peacetime' and 'wartime organisation', and the actual NATO and national alarm and mobilisation systems. It also briefly considers the relationship and importance of civil actors in realising this conscript-based force, including the emergency train plans and civil emergency laws. The chapter concludes with a number of reflections for current times, based on both similarities and differences between the Cold War period and the present.

The temporal focus in this chapter is on the most recent decades of the Cold War, the 1970s and 1980s, which are the most similar to the current state of affairs in terms of factors such as military technology and force posture. The topical emphasis is on the army, for the simple reason that, in comparison to the other parts of the military, the army's reliance on scalability was greatest and its mobilisation plans were most intricate and impactful. The limited mobilisation plans of the other services were similar and will be mentioned where relevant – and where possible. Unfortunately, mainly as a result of destruction of archival materials during the Cold War and afterwards, primary sources on mobilisation are often incomplete; this applies to the entire Cold War period and includes records of the Army, but particularly so to the other services. As a result, it is difficult, for instance, to reconstruct the exact numbers of conscripts that were counted upon during wartime, or to track the detailed changes in mobilisation procedures over the years. Nevertheless, a general picture can be drawn that provides enough

information for reflection on the relevance of the Cold War force structure for today's challenges.

National security priorities and military ambitions

Of all the factors that influenced the scalable character of the Dutch armed forces in the Cold War, two are the most important and will be considered in this section. First, the geostrategic context, national security priorities and related military ambitions. This factor is explored directly below. The second is the social and political debate over force structure and conscription, which follows thereafter. Since its inception in the late 1940s, NATO was geared towards the strategic goal of deterring large-scale aggression from the eastern European communist bloc, united in the Warsaw Pact (1955) under Soviet leadership. Its military posture consisted of two pillars. The first was the 'sword', the strategic nuclear arsenal designed to deter major war by threatening total destruction to the Soviet heartland. From NATO's foundation, this 'task' was all but monopolised by the Anglo-Saxon allies (though arguably supplemented with the independent French nuclear capability). The other was the 'shield', tasked with deterring – and if necessary, fighting off – a military invasion of European NATO-states' territories. The military presence in Europe, including virtually the entire European NATO-states' military contributions, made up this 'shield'.

To the Dutch in particular, the shield was strategically crucial. Given the geographical strategic situation of Europe, the Dutch felt quite vulnerable. Germany was divided into the pro-Western Federal Republic (NATO-member since 1955) and the Democratic Republic, member of the Warsaw Pact; Soviet and satellite states' military units were close to the NATO borders, including along the inner German border. Without serious resistance, the Red armies' engulfing of Dutch territory after their march through Western Germany could be a matter of days. As a small nation with a territory difficult to defend from the east, the Dutch were among the most ardent supporters of the 'forward defence' ambition in NATO: this was the plan of defending against Soviet aggression as close as possible to the Iron Curtain.³

Before we turn to the structure of the Dutch forces, it is important to outline the actual war scenario in the 1970s and 1980s and the role of the Netherlands' military, as this is what the forces were designed to execute. In the later Cold War, NATO and Dutch military authorities based their plans on the assessment that the Warsaw Pact required around 7–10 days to execute a partial mobilisation, deployment, and then initiate a major offensive. The assumption was that the enemy would only use conventional weapons (thus refraining from the use of nuclear or perhaps chemical arms) for as long as possible. The expectation was that, should they initiate an attack on Europe, the Soviet leadership would choose for a rapid, surprise offensive

on a broad front from the air and on land with several echelons, supported by an aggressive naval war to close the Atlantic and prevent North American reinforcements from reaching Europe. The aim would be to quickly overwhelm NATO's forces, occupy (parts of) Europe, and prevent NATO's leadership from reaching a decision on the use of nuclear weapons.⁴

Within NATO's defence effort, the Dutch had tasks on land, in the air and at sea. The Navy would take part in the allied counter-submarine effort in the Atlantic and North Sea, execute amphibian operations in Northern Norway, and help protect or clear the North Sea, Channel and Dutch coast of mines.⁵ If possible, it was also tasked with helping the allied defence in NATO's central land sector.⁶ The Air Force took part in the integrated allied air defence of the Northern half of Central Europe, including the Netherlands, and was tasked with offensive allied operations over enemy territory, particularly East Germany.⁷ The Army's 1 (NL) Corps was given a sector of the allied defensive line along the inner German border, some 350 kilometres from the home bases in the Netherlands. Additionally, the Army was responsible for securing the Netherlands' territorial sector and supplying host nation support to incoming reinforcements from the west.⁸

The military leadership of NATO's integrated military command as well as national military headquarters, spent the entire Cold War trying to balance three aspects: force size, speed, and quality of personnel and equipment. In the 1950s, NATO's military authorities emphasised size. They aimed to build a military posture that could match the massive Warsaw Pact forces in the air, on the seas and on the battlefields throughout and around Europe. However, it soon became clear that such vast forces would absorb higher defence budgets than NATO states could (or wanted to) pay for. Force size ambitions were toned down and with American aid, European NATO-states – with the Netherlands in the vanguard – raised forces with considerable dependence on conscription. Soon however, developments in military technology and shifting expectations of the war scenario saw the speed factor growing in importance: in order to withstand surprise attacks, NATO needed good intelligence, rapid political crisis decision-making, and finally, fast military deployment.⁹ Throughout NATO, and certainly also in the Netherlands which was relatively close to the battle zones, the Air Force's first war priority was for its planes to scatter and take off before enemy attacks against concentrated air fields destroyed most capabilities.¹⁰ The same was true for the Navy, which needed to leave the harbours instantly. But the Army, too, was pressed for time. The Dutch Army Corps needed to travel 350 kilometres to hold the Elbe-Seitenkanal line.

A conscript force was the only financially viable solution to fill the vast units required. That is: a force consisting of a professional, active core supplemented with large numbers of rank-and-file conscripts, partially active and partially to be mobilised; reserve officers (conscripts who had completed officer training);

and voluntary reserve forces. However, such heavy reliance on non-professional, partially inactive troops was hardly compatible with the ambition of a speedy deployment and high quality forces. Particularly for the Air Force and Navy, conscripts could only partially fill the gaps; the Army was host to many more conscripts, but here too, there was much pressure to improve reaction times and the training level of personnel so that they could use increasingly complex military technology. In part as a result of this tension and fuelled by societal pressure (as shown below) by the 1960s, the military leadership, particularly in the Netherlands, resorted to a program of 'quantity to quality': gradually reducing the size of the forces in favour of superior military technology and more agile units. This process gradually finished by and large during the 1980s – but forces remained far larger than they are today. In the 1980s, the ratio of active professionals-conscripts during peacetime was (including the Marine Corps) around 15,000:2000 in the Navy, in the Air Force ca. 15,000:5000, while in the Army, the ratio was reverse: approximately 24,000:43.500. That is, for every Army professional there were two actively serving conscripts. In case of mobilisation for full scale war, the Navy and Air Force would call several thousand conscripts to arms, while the Army would call upon 140,000 rank-and-file conscripts and (conscript) reserve officers to fill the bulk of the units.¹¹

Social debate over force structure and conscription

The structure of forces, including the Dutch measures for military scalability, are not only determined by strategy and threats alone. The ambitions or even demands of national and allied military leaders are decided upon by civil political leaders who also look to their constituencies. Society must be ready to carry the burden of defence in terms of finances and personnel. It goes beyond the scope of this chapter to examine the exact influence and dynamics, but suffice it to say that ultimately, force postures – including sizes – are a compromise between the different interests and perspectives of these actors. In this context, the history of Dutch force structure formation is characterised by limited success in the recruitment of the professionals to meet the demand that the military leadership set, accompanied by equally permanent contestation over the character and size of the conscript force.

To illustrate this point, we dive deeper into Dutch military history. At the founding of the Kingdom in 1815, the Army consisted of two separate organisations: a field army manned by professionals, to be used by King William I to wage war in and outside the national borders, and the militia, made up of conscripts and exclusively dedicated to national territorial defence. Not long after in 1820, the two were merged as recruitment efforts failed to meet the numbers required to fill the field army. From then on, the professionals formed the backbone, and conscripts

formed the bulk of the Army, particularly of the lower ranks. Until 1996, when the last conscripts signed off, the Netherlands had what was known as a ‘kader-militieleger’ (cadre-militia force).¹² While foreigners initially also served in this force, the influence of nationalism led to reforms in the 19th century that determined the military only consist of Dutch nationals.¹³ As armies grew throughout Europe in the second half of that century and into the 20th, the Dutch were forced to introduce conscripts to the ranks of non-commissioned officers (NCOs, *onderofficieren*) and officers. In the Cold War this, too, was the character of the Dutch force,¹⁴ supplemented with the hybrid institution of the Nationale Reserve (1948), made up of volunteer part-time soldiers, who could be called up to perform guarding, surveillance and humanitarian support duties in the national sector.

Throughout the Cold War period, the scalability of the force was contested. The aforementioned effort ‘from quantity to quality’ was supported by the political leadership in part to decrease the pressure on society in the form of fewer conscripts. But the fact that not every young man in the yearly cohorts was necessary, led to disgruntlement: why should I go while my neighbour has not been called up? In view of the impact of conscription on the young men concerned, the duration of the first period of service (‘*eerste oefening, eerste opkomstperiode*’) was always a social and political issue as well. The length of this period decreased from two years (or even longer in case of war, such as during the Indonesian War 1945–1949) to less than one year. This shortening saw opposition from within the military, which feared a reduction in the quality of conscripts’ training.

Specific goals of upscaling

Now that we have explained its origins and history, we turn to force scalability’s intricate character and how it operated. In essence, following the Netherlands’ allied and national military tasks, the procedures for scalability were designed to allow for the defence of key civil and military objects (‘*sleutelpunten*’) and for the deployment of all standing and mobilisable troops to their war locations. Within this scaling effort, there were a number of main components which we will outline in the next parts of this chapter. Loosely in order of executing, these were: setting in motion the NATO- and national alarm procedures; changing from the military peacetime to the wartime organisation; securing the national territorial sector; concentrating forces and moving them to their battle stations (predominantly Army units to Germany); and host nation support. These tasks required meticulous planning and preparation.

National territorial defence was *a sine qua non* for the next steps. Adequate protection of railways, political and military headquarters, electricity and telecommunication infrastructure, airfields, harbours, and so forth against sabotage or

attacks by Warsaw Pact special forces was crucial to allow for mobilisation, transport and host nation support of the reinforcements from the US, UK, and Canada.¹⁵

The alarm system

In order to be able to respond to crises in a rapid and organised fashion, NATO developed an integrated politico-military alarm response system. The crisis response procedure of the Netherlands' military branches was aligned with this NATO system as most units would come under NATO command in times of crisis.

The process of military upscaling, that is, mobilisation and deployment, in times of crisis was divided into phases. That was militarily and politically important for two main reasons. First, it was practical, as moving hundreds of thousands of people, vehicles, ammunition, and more over roads and railways simultaneously was impossible. Second, the escalatory impact of mobilisation and deployment on international tensions, and the disruptive effect on societies, made it important to allow for a gradual military response appropriate to the threat and circumstances.

The alarm procedure was as follows: acting as the highest authority to determine crisis measures was NATO's political decision-making body, the North Atlantic Council (NAC) in which governments were represented, or the Defence Planning Committee (NAC/DPC) in its place.¹⁶ The NAC could choose from a range of preventative measures, in the politico-diplomatic, economic, or military spheres (such as staging a military exercise). They could also decide on the deployment of allied *Immediate Reaction Forces*, *Maritime Contingency Forces* and military reinforcements from overseas.¹⁷ The three Major NATO Commanders – the Supreme Allied Commander Europe (SACEUR), the Supreme Allied Commander Atlantic (SACLANT) and the Commander-in-Chief Channel (CINCHAN) – were authorised to declare the state of *Military Vigilance* without prior agreement of the NAC/DPC. This allowed for measures of higher readiness. The Dutch Chiefs of Staff would then declare the same state for the Dutch military branches.¹⁸ The lower commanders had their own 'MilVig' crisis playbook ('draaiboek') to alert the forces.¹⁹

Next was the *Formal Alert System*. The steps in this system required consent from the NAC/DPC, except for scenarios of sudden, rapid deterioration (in a matter of hours or less), in which case the Major NATO Commanders were predelegated to declare the Formal Alerts themselves. The first was *Simple Alert*, calling for the assigned forces such as the active part of 1 (NL) Corps, to be at maximum readiness and placing them under operational command of major NATO and subordinate commanders, in the case of 1 (NL) Corps SACEUR and commander Northern Army Group (NORTHAG) respectively. The next step, *Reinforced Alert*, saw the forces become fully mobilised, deployed and combat ready. The last step was *General*

Alert, which would coincide with the outbreak of major hostilities and set in motion the operational plans. Additional was the special *Counter Surprise Military System*, designed for a coordinated response to a sudden, imminent threat. The *Major NATO Commanders* and *Major Subordinate Commanders* were pre-delegated to, without prior NAC/DPC consent, declare *State Orange* (in case of expected major attack within hours) or *State Scarlet* (major attack within an hour or under way). This would instantly put the designated army units under the command of commander NORTHAG.²⁰ These units had to move within two hours to their ‘fallback area’ a short distance from their barracks.

Organisation for peace and for war

Since peace and war required performing very different tasks, the Netherlands armed forces had an organisational structure for both. While the peace structure was the default organisation, it was based on the war organisation; after all, the military’s purpose was to function during war time if circumstances required. Given the possibility of short notices to mobilise, the military did not expect to have time during crises to review and change the war organisation. Political and military leaders had to act immediately and the system had to work smoothly.

Therefore, the peacetime military was not only a standing force to deter any immediate aggression and perform the first tasks during mobilisation, it was also an organisation geared towards training, planning, innovation and other preparations for war scenarios. Every member of the military, including conscripts, had to be trained and ready for their war tasks. Professional personnel especially in the Army formed the core of units, charged with administration, training and planning, for instance making sure that all required materials were in the mobilisation warehouses.²¹ This way, units could hit the ground running if and when mobilised conscripts joined the ranks, as explained below. Many professional military members had different roles in the wartime organisation; they would change from tasks such as instructor or planner, to field commander.

The process of mobilisation

Mobilising the armed forces means putting them on a war footing. Preparations made during times of peace were aimed at allowing for a rapid and orderly transition from a peace to a war organisation. This included measures such as administration of conscripts per unit; drawing up troop formations and battle orders; announcing mobilisation destinations to all individuals concerned and

to relevant civil agencies, such as mayors and municipal secretariats; preparing requisitions of vehicles, buildings and various goods and services; and arranging mobilisation and concentration transports (see below). When tensions would rise and a (partial) mobilisation was imminent, the quartermasters would set to work preparing the mobilisation centres to facilitate the arrival of mobilised conscripts.

The mobilisation of the various categories of conscripts and the movement of the professional soldiers to their mobilisation destinations was regulated by a series of telegrams to be sent in phases and linked to the NATO alert system. These telegrams would be issued by the government, that is, the Council of Ministers. If time permitted, they would consult a committee consisting of the national Chiefs of Staff, the senior civil servant for Political Affairs at the Foreign Ministry ('directeur-generaal Politieke Zaken, Ministerie van Buitenlandse Zaken'), a representative of the Prime Minister's office, and the chairman of the national Intelligence Services Committee (Comité Verenigde Inlichtingendiensten in Nederland).

Almost simultaneously with NATO's *Military Vigilance*, the Dutch 'waarschuwingsfase' ('warning phase') was announced with telegram X. This was the Minister of Defence's sole prerogative. It called to arms the 'klein-verlofgangers' ('short leavers'); conscripts that were at 24 hour notice to move and had undergone their training less than six months ago. The next day, telegram N, also communicated via the internal military network system, would call the Nationale Reserve and certain professional personnel to their war locations.²² Telegram RBO (Regeling Buitengewone Oproeping, Extraordinary Mobilisation Order) would also be issued, activating the *Host Nation Support* organisation and the National Territorial Command; these would have to be activated at least 72 hours before the arrival of the first allied (mostly American) reinforcements.²³

Next was the general mobilisation. It was designed to call to arms the bulk of the conscripts on leave with longer notices to move, through a series of telegrams publicly communicated via radio, television and printed press. Still during *Military Vigilance*, telegram R and, six hours later, telegram V announced the first phase of general mobilisation.²⁴ Then the units that would be deployed in the area of operations in West Germany would be mobilised or replenished in phases. These units had just finished their active service period, but had remained together organisationally as a unit during the first years of their 'long leave'. At the same time, mobilisable units had to show up for the defence and security of the hinterland (the National Sector, the Dutch territory). In the second and third general mobilisation phases, military personnel with P or Q and B or C telegrams, respectively, had to appear at the mobilisation centres.²⁵ These phases coincided with the NATO *Simple Alert* and *Reinforced Alert* phases, respectively. Conscripts and professional personnel that had served for less than eight weeks returned to civilian status. With this, the Army was fully mobilised.

Figure 3.1: Schematic overview of the Dutch mobilisation procedure, 1970s–1980s (numbers in the rightmost column are estimated based on plans dated 1973)

Phase	Telegram	Time	Authority	Units and personnel numbers
Warning phase (Military Vigilance)	X	- 24 hours	MoD	Short-leave conscripts (7000)
	N	0 hours	Government	Mostly reserves (4500)
	RBO	0 hours	Government	Host Nation, Territorial Command (Army: 15.000, Navy: 3.000; Air Force: 2.000)
1st mobilisation phase (Military Vigilance)	R	0 hours	Government	Conscripts RIM (>27.000)
	V	6 hours (duration 24 h)		
2nd mobilisation phase (Simple+Reinforced alert)	P	18 hours	Government	Conscripts long leave (>39.500)
	Q	24 hours (duration 36 h)		
3rd mobilisation phase (Simple+Reinforced alert)	B	42 hours	Government	Conscripts long leave (>58.000)
	C	48 hours (duration 48 h)		

The entire process of mobilisation, moving from the peace to war organisation, was not only prepared in detail but also practiced regularly at several levels. The highest military and political staff levels in the national headquarters and at NATO practiced and reviewed the process biennially in the *Wintex* exercise. Regional and unit-specific tests were also carried out at unsuspected moments under the name ‘*Donderslag*’ (Thunderclap), mostly testing the readiness of units on 24 hour notices to move.²⁶

Additional measures and partners

The scalability of the Dutch forces was not only dependent on military planning and logistics. The cooperation of civil governmental organisations and society was crucial for a fast and orderly mobilisation of the scale outlined above.²⁷ These were based on an intricate legal framework, atop of which was the *Oorlogswet voor Nederland* (‘War Law for the Netherlands’), which provided the basis for the Dutch government to declare State of War (*Staat van Oorlog*) or the even further reaching State of Siege (*Staat*

van Beleg).²⁸ These provided the military authorities but also the civil governmental institutions with far reaching authorities to guarantee military and civil security.²⁹

Some of the most important measures were related to transport. While the military had large reserves of vehicles and buildings, it did not have adequate means to allow for the transport and housing of all mobilised personnel at their assembly points and battle positions. Emergency laws were designed to make use of civil assets: there were laws on requisition (*Vorderingswet*) and expropriation (*Onteigeningswet*) to provide additional vehicles, machines and other items and services; and on quartering (*Inkwartieringswet*) to provide locations (real estate). But even more was required. To facilitate unhampered, upscaled transport on road, sea and rivers, by air and on rail, several laws were prepared to clear crucial transport lanes, and militarise parts of the merchant sea, river and air fleets.³⁰ For the shipping sector, for instance, there was a plan to issue a 'discrete warning', possibly even before official mobilisation, to shipping companies to pull their assets out of certain areas,³¹ and in case of a surprise conflict, to scatter the merchant fleet at sea and navigate out of the direct danger zones (*Ocean Clearing Policy*) as well as the partial militarisation and requisitioning of the merchant fleet for the war effort.

Of supreme importance was railway transport. In the 1980s, the Emergency Plan Train Services ('*Noodplan Treindienst*') was available, designed for mass mobilisation and deployment transport. Its execution would be coordinated from a special command bunker of the *Nederlandse Spoorwegen* (Dutch national railways). Train drivers, mechanics, signal box operators and other crucial functionaries would be obligated under martial law to drive and operate the trains according to special timetables – they were exempt from military conscription for this reason.³² Politico-legal mechanisms were prepared with the West German authorities to revoke the border regulations to allow for smooth passage.

Another crucial domain was the contribution of civilians to military operations and to the safekeeping of the home front – i.e. civil defence.³³ A number of laws and regulations covered this domain, too.³⁴ The medical crisis plan called for the upscaling of civilian hospitals for military and civilian casualties.³⁵ Some specialist civilian companies and government agencies could be obliged to cooperate with defensive preparations through tasks such as digging or clearing roads. Special 'forbidden locations' were designated to be evacuated to allow for defensive measures, for instance installing air defence equipment or even to flood areas (inundations), but also for ground defence perimeters around key infrastructure, command posts, power plants and more. The families of Dutch, British, and American military personnel and governmental agents in West Germany also had to be evacuated. In general, preparations would have to be made for large streams of refugees, fleeing from the Red Army, from the east into the Netherlands and, in case of fights or bombings, within the national sector.³⁶

Conclusion: insights and reflection

A comparison between the Cold War era and today begins with the difference in strategic situations and the societal perception thereof. Back then, there was widespread popular backing for a defence policy with much larger and more expensive armed forces, as well as far reaching war preparations. Despite the unpopularity of nuclear arms specifically and of the conscription among some parts of the populace, the Dutch people as a whole overwhelmingly supported the associated scaling-up measures to deter and defend against a massive Warsaw Pact attack. The capabilities of the massive communist forces were considered real. The urgency of the threat perception, however, was somewhat more complex. By the 1980s, the possibility of an actual large-scale war had shifted to the outer edge of most citizens' consciousness. Rather, the idea prevailed that if a grand scale war did break out, no one would survive it due the prevalence of nuclear weapons on both sides – weapons which had become particularly unpopular.

Nowadays, popular support for the armed forces has to be rekindled, as the threat perception is different. The possibility of a military encounter with the adversary to the east is now assessed as more conceivable, particularly among experts, but it seems that among the general population, the sense of urgency with regards to defence is less palpable. A contributing factor is likely the geographical difference between the two scenarios: in the Cold War, the focal point of the European conflict was likely to take place in the heart of Germany, close to the Netherlands, and the threat of longer range aerial threats to Dutch territory was more present. By contrast, the land battles of a war today would mainly play out in former Warsaw Pact and Soviet republics, with a lower probability of expansion into an unimaginable all-out (nuclear) war. Still, the chance that the Netherlands itself could come under fire remains a possibility that cannot be ruled out, initially through hybrid attacks, perhaps also through military operations.

Here a second difference between the Cold War and the current situation emerges: although various forms of hybrid warfare were also the order of the day back then – such as psychological and economic warfare, and infiltrations of key institutions – the central effort was to avoid, or if necessary, wage, a major military confrontation. In terms of the military reality in Europe, the line between war and peace was clearer than it is nowadays; the general perception is that a conflict is already ongoing on several fronts. In a military form in Ukraine, in hybrid forms elsewhere – through sanctions, information and cyber warfare, among others. As such, a defence against a revanchist Russia that aims to reclaim 'lost' territories and attempts to destabilise the West in the meantime, calls for a varied package of defensive measures, military as well as non-military. This means that even more than during the Cold War, relations with non-state actors such as private

companies, non-profit organisations and individual experts will have to be strong in order to defend against, for instance, attacks on crucial infrastructure and their disruptive effects on society.

As a consequence of these two points, the third difference between then and now is the extent of military scaling-up deemed necessary. Back then, an all-out effort was made to create a very large force which could be ready in the shortest possible time. Therefore, general conscription for men was necessary. From a military strategic perspective, it was not illogical that when the Cold War ended, conscription would be abolished. The perceived disappearance of a major threat to NATO's integrity and the reorientation to 'wars of choice' called for smaller, professionally trained units. But the consequence is that, with a new large-scale threat on NATO's eastern border, authorities in the Netherlands and neighbouring states now have to plan and concretely prepare a military and societal scale-up almost from scratch in case of an acute crisis or war. Currently – without trained conscripts – the Netherlands armed forces are not equipped for very large-scale operations; they have been focusing mainly on raising degrees of readiness, stockpiles and fire power. As seen in this chapter, the design of a force posture (ideally) starts with a formulation of the threat and the military goals, which must then be translated into military capabilities, including force size. Should NATO and the Dutch authorities decide that a larger-scale and possibly long-lasting military confrontation is a realistic scenario and therefore requires a much larger force size to deploy elsewhere in Europe and in the national sector, then reinstating compulsory attendance of the first training and combat-ready period for conscripts seems inevitable. In that case, many of the measures featured in this chapter can serve as inspiration for such new conscription and mobilisation policies.

That leads to the possible insights from the Cold War for current scenarios. Today, too, there will have to be a balance between force size, quality and speed. It is important in this context to realise that the distance that Dutch units are likely to be ordered to travel to their war positions will be considerably greater than during the Cold War and will cross more state boundaries, leading to additional legal, practical and political challenges. In order to prevent an inverse correlation between growing force size and speed, it is useful to reflect not only on the fundamental but also practical insights from the Cold War period. Consider, for example, bringing and keeping supplies up to standard in Dutch territory and in forward depots. This may seem obvious, but during the Cold War it was taken very seriously, although it was also a major point of contestation due to the fact that stockpiles were an easy target for budget cuts. Furthermore, it seems advisable to link as many measures as possible to an appropriate NATO-wide alert system, to precisely map out all subsequent and simultaneous measures to be taken, to draw up scripts and practice them repeatedly, to prepare troop movements and prepare

the infrastructure, and to make international and military-civilian agreements and keep in constant communication with relevant actors. Not only does the Cold War case point in these directions; the rapid outbreak but then protracted course of the war in Ukraine also illustrates that more attention will have to be paid to the personnel and material logistics and sustainability, and any civilian involvement will have to focus on this. One example is the position of crucial civilian personnel in key private or public services. Their position was clearly defined in the Cold War, but can they be expected to perform tasks today? And persons in such positions used to be exempted from military service; nowadays the ranks of the – limited number of – voluntary reserve forces contain a considerable number of persons who also fulfil key civil roles. Does it prevent the same persons from being indispensable in times of crisis in both the armed forces and their civilian roles, as was arranged for crucial train crews during the Cold War?

Things as they stand currently should not just be seen as a worse point of departure than sixty or forty years ago. There are some advantages: a military mobilisation will probably be smaller and the peace and war organisation can become more closely aligned than before. As a result, it will be less socially disruptive and all units will be ready for deployment more quickly and smoothly. In conclusion, the purpose of scaling up and therefore its scope and nature differ from those during the Cold War, but the challenges from that era as well as the solutions can be of great help in designing current measures.

Notes

- ¹ The authors thank Rogier Koedijk, Anselm van der Peet, Herman Roozenbeek, and Quirijn van der Vegt for their advice and reflections on the contents of this chapter.
- ² See: J. Hoffenaar, “The Royal Netherlands Army, 1814–2008”, 48–55; W. Klinkert and J.W.M. Schulten, *Mobilisatie in Nederland en België 1870–1914–1940*; and Michiel de Jong and Jan Hoffenaar, *Op herhaling. De Koninklijke Landmacht en haar reservisten 1945–2006*.
- ³ Jan Hoffenaar, “To defend or not to defend.”
- ⁴ For a good insight into how NATO and the Warsaw Pact thought about the possible course of a war in Europe, see: J. Hoffenaar and C. Findlay, eds., *Military planning for European theatre conflict during the Cold War*. For the Dutch threat perceptions and war scenarios, see also: Jan Hoffenaar, “Kleiduiven schieten in horizontale richting”, 286–309; Anselm van der Peet, “The threat that never was?” 330–49; Quirijn van der Vegt, “LUID en duidelijk. Dreigingsappreciaties van de Luchtmacht Inlichtingendienst tijdens de Koude Oorlog, 1945–1989”, 310–29.
- ⁵ See: Dick Schoonoord, *Pugno Pro Patria. De Koninklijke Marine tijdens de Koude Oorlog*, passim.
- ⁶ Admiral BENELUX had to take into account that – possibly at an early stage of hostilities – a request would reach him to evacuate a Dutch or a German battalion from the German Bight. NIMH, collectie Koopvaardijzaken Marinestaf, OP-BDZ 1977, 140.
- ⁷ See most importantly: Quirijn van der Vegt, *Take-Off. De opbouw van de Nederlandse luchtmacht 1945–1973*.

- ⁸ For more information, see: Jan Hoffenaar, "The Dutch contribution to the defense of the central sector", 217–38; in Dutch, see: Jan Hoffenaar and Ben Schoenmaker, *Met de blik naar het Oosten. De Koninklijke Landmacht, 1945–1990*.
- ⁹ For disambiguation: Warsaw Pact preparation time, NATO warning time, and NATO response time are three different concepts. Preparation time is the time a party needs or takes to take military action. Warning time is the time a (counter)party actually has to proceed to (counter)action. Response time is the time a (counter)party needs to be ready to proceed to (counter)action.
- ¹⁰ Some of the 'nuclear' aircraft at Volkel would be transferred to De Peel for risk dispersion in a particular alert phase. The remaining aircraft at other airfields would not be dispersed in a crisis situation in the 1980s.
- ¹¹ W.J.E. van Rijn, *Overstag en toch op koers. De Koninklijke Marine en haar personeel 1945–2005*, bijlagen 4 en 5; Van der Vegt, *Take-Off*, 386; Hoffenaar and Schoenmaker, *Met de blik naar het Oosten*, bijlage 4.
- ¹² Conscriptio itself has not yet been abolished, only compulsory attendance of the first period of service has been suspended. Conscriptio was extended to include women in 2020.
- ¹³ Swiss regiments still served in the Royal Army until 1828. H. Amersfoort, *Koning en kanton. De Nederlandse staat en het einde van de Zwitserse krijgsmacht hier te lande 1814–1829*.
- ¹⁴ Conscripts and reserve personnel could be 'exceptionally called into actual service' under article 30 of the Conscriptio Act and paragraph 1 of article 4 of the Reserve Personnel Act.
- ¹⁵ This was practiced annually during the exercise *Reforger* (Redeployment of Forces to Germany).
- ¹⁶ The North Atlantic Council is the main political decision-making body within NATO. The Defence Planning Committee guides the integrated defence build-up and decides on all military matters. The DPC has the same level of authority as the NAC.
- ¹⁷ The Netherlands contributed to the *Immediate Reaction Forces*: a flying squadron to the AMF (*ACE Mobile Forces*), at least one frigate to the *Standing Naval Forces Atlantic* and at least two minesweepers to the *Standing Naval Forces Channel*. It would contribute with ships, maritime patrol aircraft and amphibious forces to the *Maritime Contingency Forces*, depending on the contingency plan. And it would provide *Host Nation Support* to reinforcements from overseas.
- ¹⁸ Incidentally, most Air Force combat units (the flying squadrons, the guided weapons squadrons, airfield air defences and combat control centres) and some Navy units had already been placed under various forms of command of a NATO commander in peacetime. The transfer of authority of Army units – with the exception of a Signal Squadron for the Northern Army Group – would only take place during the following NATO alert phases.
- ¹⁹ This section and those below are a distilled, broad-strokes picture based on a number of primary sources from the 1970s and 1980s. For the Royal Netherlands Army, particularly relevant are the consecutive versions of the 'Mobilization Order Army' (VS 2-1050) and the 'Alarm' or 'Alert Book Army' (Alarmboek KL). Versions – often incomplete – up to the late 1970s can be found in the Netherlands National Archives, The Hague (NL-HaNA) in: Ministerie van Defensie, Generale Staf; Staf van de bevelhebber der Landstrijdkrachten, later Landmachtstaf, 2.13.110, inv.nrs.1851-1853. Later versions are kept at Ministerie van Defensie, Semi-statisch Informatiebeheer, Rijswijk (SIB). Derivative Alert Book versions on logistics from late 1980s-early 1990s are found in NL-HaNA Staf 1e Legerkorps 2.13.148 inv.nr.694. Important sources relating to the scaling-up of the Royal Netherlands Navy include part 1 (personnel) and part 2 (materiel) of the 'Mobilization Regulations of the Royal Netherlands Navy' (VVKM 38) and parts of the 1977 'OP-BDZ' (Operation Plan Commanding Officer of the Royal Netherlands Navy) (NIMH, collection Koopvaardijzaken Marinestaf, inv.nrs. 43, 208, 212). The Royal Netherlands Air Force also had its 'Alert' or 'Alarm Book' (ABKLu) and regulations 'War Preparation Royal Air Force' (VOV-KLu); consecutive edits and versions can be found in NL-HaNA, Archief Chef Luchtmachtstaf 1951–1986, 2.13.113, inv.nrs. 4440–4462.

- ²⁰ Among the designated forces, a distinction is made between ‘assigned forces’ (immediately deployable in NATO), ‘earmarked forces’ (deployable in NATO in a few days to a few weeks) and ‘other forces to NATO’ (possibly available for deployment in NATO).
- ²¹ For additional information on military administration, see: H.L., Zwitzer, *Comptabiliteit in uniform. 200 jaar Militaire Administratie 1795–1995*.
- ²² For 1973, reliable figures on the numbers of soldiers to be called up with each telegram are available. Telegram X involved 7,000 short-leavers and telegram N involved 4,500 servicemen spread across the three branches of the armed forces. Annex attached to memorandum United Chiefs of Staff Committee – ‘Memorandum on actions to be taken by the Minister of Defense in case of rising tension c.q. Sudden Alarm’ – No 350/12388, 25 October 1973. NL-HaNA, Archief Verenigde Chefs van Staven, 2.13.180, inv.nr. 204. Given the ‘maldeployment’ of the 1 (NL) Army Corps, there was talk of the Netherlands issuing these telegrams earlier and anticipating NATO alerts.
- ²³ This included 15,000 Army military personnel in 1973, 3,000 from the Navy and 2,000 from the Air Force.
- ²⁴ In 1973, telegrams R and V required 27,000 Army soldiers to report. Telegram R heralded the actual mobilisation, telegram V followed 6 hours later.
- ²⁵ This involved 39,500 Army personnel in 1973 for telegrams P and Q and another 58,000 Army personnel for telegrams B and C. Telegrams P, Q, B and C were sent 18, 24, 42 and 48 hours after telegram R, respectively. Because the conscripts with telegram order C were scheduled to take 48 hours to mobilise, the overall mobilisation would not be complete until four days later.
- ²⁶ De Jong and Hoffenaar, *Op herhaling*, 92–98.
- ²⁷ See on this point also: Daan Theodorus Sanders and Floribert Baudet, “Civiele verdediging en civiel-militaire interactie in Nederland tijdens de Koude Oorlog, ‘Een enigszins redelijke bescherming van de bevolking en van het nationale potentieel,’” *Militaire Spectator*, 2025.
- ²⁸ In 1964, the War Act of 1899 was replaced by a new law, which in turn was replaced in 1996.
- ²⁹ In addition, the Extraordinary Powers of Civil Authority Act (Wet Buitengewone Bevoegdheden Burgerlijk Gezag) applied.
- ³⁰ Among others, the Transport Emergency Act (Vervoersnoodwet), Defence Preparation Cooperation Act (Wet Medewerking Verdedigingsvoorbereiding), National Shipping Emergency Provisions Act (Rijkswet Noodvoorzieningen Scheepvaart), Railway Act (Sporwegwet), Aviation Act (Luchtvaartwet), Port Emergency Act (Havennoordwet), Boating Duty Act (Vaarplichtwet).
- ³¹ These included the waters of the Soviet Union and its ‘satellite countries’, the Baltic Sea, the Black Sea, German North Sea ports, the Adriatic Sea, the Aegean Sea, the Arctic Ocean and the North American Great Lakes.
- ³² This ‘driving duty’ can be compared to the boating duty for personnel in the merchant navy. For more details on rail transport at the time of war or threat of war see: Michiel van Ballegoijen de Jong, “NS en de Koude Oorlog”, 491–97.
- ³³ On this topic in the Netherlands’ case, see also: Bart van der Boom, *Atoomgevaar? Dan zeker B.B. de geschiedenis van de Bescherming Bevolking*; Mark Traa, *De Russen komen! Nederland in de Koude Oorlog*.
- ³⁴ Among others, the Military Inundations Act (Wet Militaire Inundatiën), the Emergency Labour Act (Noodwet Arbeidsvoorziening), the Emergency Food Act (Noodwet Voedselvoorziening) and the Population Displacement Act (Wet Verplaatsing Bevolking).
- ³⁵ For more information see also: T.D. Duurland, *Asklepios en het zwaard: de Nederlandse militaire geneeskunde in de schaduw van de bom, 1949–1989*.
- ³⁶ G. Teitler, “Evacuatie, vlucht en opvang. Voorbereiding op een Sovjetaanval”, 102–17.

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PART 2

Organising Scalability

Strategic Defence Production: Resource Scaling from an Organizational Network Perspective¹

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Abstract

Given the unstable geopolitical situation the world is facing today, Western countries have started to investigate scaling capabilities to ensure military response to crises. Availability of sufficient resources before and during a crisis is of utmost importance. Extant literature concerning this subject is scattered, especially on the upstream side of value chains (industry). This research explores delves into how (defence) production networks scale their capabilities in terms of upstream resources, including when a crisis is not (yet) happening. This chapter integrates theories on multiple exchange relationships to study the Dutch military drone ecosystem. Insights focus on ambitions and foundations for ecosystem development, and new governance patterns linking NL MoD and public-private partners.

Keywords: Upstream scaling; Military logistics; Innovation; Civil-military value chains, Network scaling.

Introduction

After an era of peace and triggered by the Ukraine and grey zone wars,² military organisations have rediscovered scaling capability as a quality to add to advanced technologies and concepts. Once a crisis³ hits, often at unpredictable moments, demand for products and services explodes, sending shockwaves through markets and value chains. This demand involves helping people in dire need, in other words, addressing foundational functions in terms of the Maslow pyramid, such as food, drink, shelter, and security.⁴ On the flip side, military organisations increasingly pay attention to the upstream scaling challenge of extending resource sets, preparing markets and enabling value chains. ‘Upstream’ is a value or supply chain term, denoting ‘activities ... close to the exploitation of natural resources, whose output is a primary commodity or virgin material.’⁵ Downstream refers to the final use and consumption of products. Upstream scaling represents a complex problem:

- How can networks scale, what industry base is required in a pre-war era, and what role can NL MoD play in this regard?
- How much scaling is warranted and how is it financed?
- In a contextual sense, how can organisations deal with and possibly change applicable laws and policies (e.g., procurement)?
- What new capabilities within and across organisations are required to effectively scale?

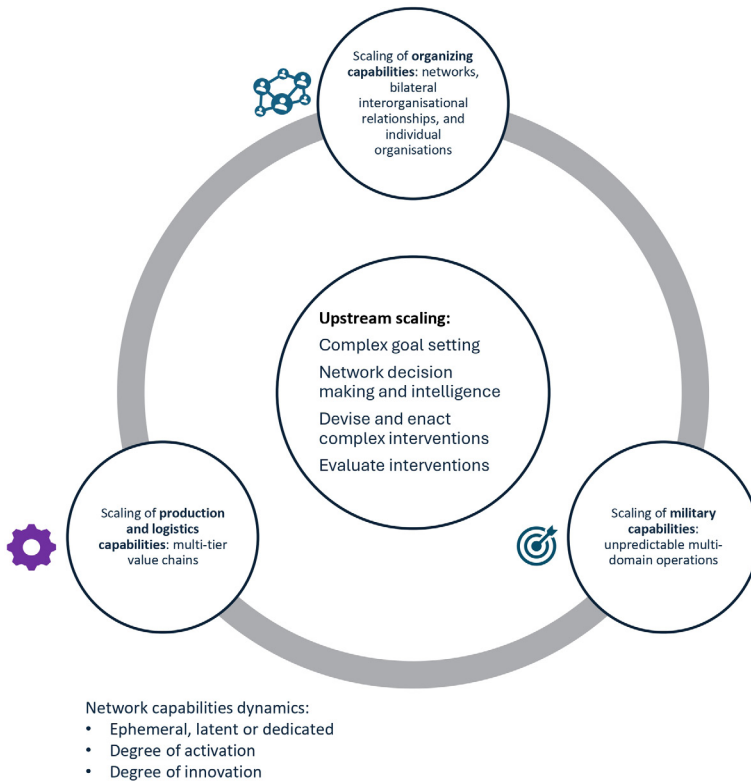
Additionally, scaling involves a multitude of state and non-state actors, calling for network organising across various societal sectors.⁶ Research so far is scattered across military, business and organisational literatures, heeding insufficiently to complex dependencies and (strategic) renewal of production structures. An integrated perspective geared towards military upstream scaling is lacking, as well as consideration of the public structures in which military scaling takes place.

Our primary scope is upstream networks pertaining to the Netherlands defence sector. This heterogeneous⁷ field level is ‘below’ overarching processes between nations, and ‘above’ individual organisations. We define scaling as: *‘the processes of upstream development and use of resource capabilities.’*⁸ *These capabilities underpin variation of supply quantity and its qualities, geared towards strategic and operational security demands’.* We focus on upstream scaling of resources involving production and logistics, such as supplying weapon systems and ammunition. Our definition of scaling calls for ensuring that resources for military organisations can contribute to security, regardless of the circumstances and types of operations. In this exploratory study, our objective is to develop and validate a framework for fostering strategic thinking about upstream scaling for defence involving military, business and organisational dimensions. Specifically, we ask three questions resonating with a multilevel lens:

- How are hierarchical, market and network governance elements combined in production networks that scale?
- How are organisational interests and incentives induced in these production networks?
- How can upstream scaling capabilities be developed in cooperation between the public sector and industry, even when a palpable crisis is not (yet) happening?

Our study is setup, first, by elaborating on and integrating literatures on military, business, and organising capabilities. The primary theoretical lens advocated here is the combination of bilateral and multi-organisational collaboration across sectors, involving challenges of rallying interests and dealing with orchestration. Figure 4.1 summarises our exploratory framework comprising the capabilities and, in the centre, possible ways for dealing with them.⁹

Figure 4.1 Upstream scaling capabilities



We then shift to empirics, examining the Dutch government's initiatives to (1) foster 'productiezekerheid' (security of supply),¹⁰ and (2) the emerging drone ecosystem in The Netherlands.¹¹ Next, implications are explored for professionals and researchers. The chapter concludes with insights pertaining to the research questions.

Multi-organisational collaboration: integrating three capabilities

Upstream scaling of resources involves a myriad of public and private organisations, connected by multiple exchange relationships. Major wars have been repeatedly associated with massive volumes of production and logistics.¹² Organisations work on ways to position themselves and to shape their exchanges as they serve their own and collective interests.¹³ Public organisations, for instance, focus on collective value creation, which requires specific exchanges with firms to acquire required

resources. Private organisations are concerned about their business model and meeting the needs of shareholders and stakeholders.¹⁴ To unpack this exchange complexity, we adopt a multi-organisational collaboration lens. We distinguish and integrate three capabilities that provide resources: military, business, and organising capabilities.

Military capabilities

It is not easy to predict the outcome of wars: advanced technology, mass, industrial capabilities, critical materials; probably a mix of these is called for to win. Historically, military campaigns have demonstrated that an ineffective logistics function or collapse of the logistics network can have disastrous implications for the military campaign.¹⁵ The logistics function of the military organisation deals with vast numbers of supply, delivering to multiple units that are geographically dispersed in a dynamic area of operations. Moreover, it is also characterised by reverse logistics due to combat casualties and damaged systems.¹⁶ Thus, military logistics could be viewed as a network of dynamic linear and closed loop supply chains. This demonstrates the importance of agile supply networks and the ability to scale up and down relative to the requisite flexibility of the operation, especially given the unpredictable nature of war.¹⁷ Unstable demand could potentially lead to a bullwhip effect¹⁸, which decreases military logistics operational effectiveness.¹⁹ Additionally, intentional (hybrid) supply chain disruptions by adversaries could lead to the ripple effect.²⁰ Both these effects undermine operational effectiveness and scalability. Hence, resilient, or robust supply networks are indispensable. Yet merely viewing supply network resilience from the military organisation's point of view may lead to mismatches of scale (temporal/spatial).²¹ Consequently, logisticians should not focus solely internally on maintaining an engineering-based equilibrium of the supply network.²² Due to the continuous evolution of military operations and the unpredictable nature of war, a socioecological perspective based on adaptation is more suitable to scale up and down while maintaining a resilient supply network. In contemporary literature, this phenomenon is also known, among others, as supply chain plasticity.²³ Thus, scaling military logistics requires external integration that moves beyond the boundaries of the military organisation: it depends on the military industrial complex's ability to manufacture and deliver supplies relative to the changes in military operational intensity.

Business capabilities

From a *resource* perspective, the military relies on numerous categories of products/services,²⁴ with value chains consisting of up to 18 tiers.²⁵ Digitalisation offers

opportunities for new resource benefits, e.g., scalable cloud.²⁶ Simultaneously, the military relies on (partially) physical systems, so digital scalability is only partially of use for the military.²⁷

In terms of *business*, firms create value by engaging in resource processes.²⁸ This entails intra-/interorganisational governance to organise operational activities. They require contracts for products, services and capacity. Scaling could enthuse firms – being risk conscious – to enlarge production system capacity, e.g., when military organisations (promise to) order more, or new markets open up. Upstream scaling is primarily a challenge of developing business cases and improving productivity.

From a *multifirm* perspective, supply webs have evolved to become embedded in public-private societal systems.²⁹ Across firms, production architectures³⁰ evolve and institutionalise. Interorganisational cooperation may enhance rent generation and serve as an example of scaling.³¹ This calls for new sourcing models such as alliances and platforms. In defence markets, scarcity upstream is becoming a major problem, with soaring customer demand and some actors controlling key nodes in production-logistics structures.³² An example would be weapon system IP or raw materials. The current security situation – including pressure on Europe to enhance autonomy – raises concerns: unpredictable and massive demand peaks from multiple countries striving for priority³³ make market failures very notable, and calls for public interventions increase with (European) initiatives to boost military production. In general, societies tend to have laws allowing them to shift to a public-centric regime in war time, but this completely disrupts market systems relying on entrepreneurial risk taking.³⁴ Finally, societies struggle with the increasing burden of defence expenses and resource usage that excludes other opportunities.³⁵

Organisational capabilities

We further unpack “scaling” from an organising perspective in this context as amplifying activities with the ultimate goal of increasing military capabilities. A major part of this process is the ability to increase material output at the right time; but in a knowledge society and in times of “cognitive warfare”,³⁶ scaling is more than just bulk and volume. Next to mass produced goods (i.e., ammunition), high-tech systems in low numbers (i.e. advanced air defence systems) and dual use good (i.e., software), a new category of equipment has become central to current warfare, which Horowitz (2024) calls “precise mass”.³⁷ These are technically advanced systems extended from civilian use, such as drones. Relying on as much standardisation as possible, they can be produced at scale and are extraordinarily cheap compared to other equipment such as tanks, ships or (military)

infrastructure.³⁸ Given these four different types of equipment, a discussion on scaling of organisational capabilities must focus on the organisational implications of production volume as well as enlarging and intensifying knowledge development and exchange.

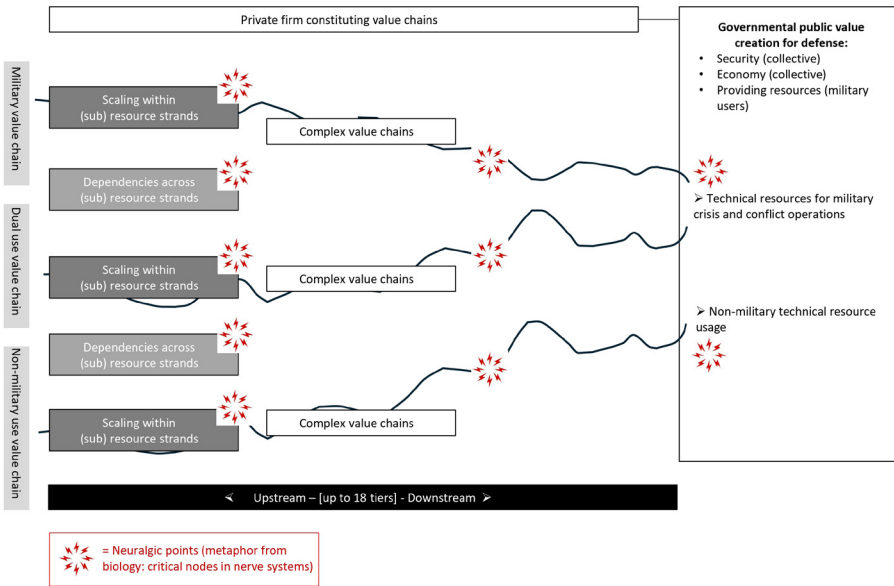
Next to “scaling up” (volume), “scaling across” becomes important especially in a time where dual use goods become essential. Increasingly, a multitude of public organisations, companies, sector organisations and military organisations will be involved. We distinguish three perspectives when it comes to organisational capabilities:

- From an *organisational level perspective* increasing output mainly requires a classical growth approach. The main question is how to ramp up production capacity in terms of resources, machines, people, buildings, and organisational structures, which has a strong effect on information exchange, coordination and organisational culture.³⁹
- From a *dyadic perspective*, every company needs external input for its production process since it is impossible and highly inefficient to produce everything. However, that creates dependencies with other companies and subsequently in house uncertainties, since there is limited control over the quantity, quality, and timing of the delivery upstream⁴⁰
- When we think about scaling from a *multi-organisational collaboration perspective*, it is important to determine in what specific organisational setting the collaboration takes place. This may encompass more than two organisations, i.e. exceeding the dyadic level and leading to multilateral exchange and bargaining.

The specific setting of the collaboration has implications for the governance and the implications for and from scaling. We can distinguish between eco-systems, learning networks or purpose-oriented networks, which are different forms of organising collaborations implying different structures, processes and governance and different roles of military organisations.

Scaling requires two interventions or system changes regarding the production of military equipment. First, an intervention is necessary to create at least some common understanding among key actors that they are part of a military goods production system and create a basic structure for scaling production if needed. Second, if the need arises, the actual amplification of efforts and activities needs to happen. For the success of both interventions, it is crucial to try to identify possible bottlenecks or neuralgic points which can potentially hamper or block the scaling within the whole system. Figure 4.2 illustrates abstracted value chains associated with these interventions, triggered by governmental demand (right hand column).

Figure 4.2 Value chains and upstream scaling for defence



Case Study: drone ecosystem for defence in the Netherlands

Context and methods

We conducted a case study on the emerging military drone ecosystem in The Netherlands. This ecosystem promises to become a prominent example next to *Nederland Radarland* and *Ecosysteem Logistiek*.⁴¹ We held interviews with professionals from NIDV, NL MoD's FRONT,⁴² COMMIT⁴³ (JIVC), DGB, RNL Army, and NLDA,⁴⁴ and incorporated input from NEDS2024.⁴⁵ In terms of context, the Ukraine war⁴⁶ has expanded the role⁴⁷ of unmanned systems as an operational tool⁴⁸ and production challenge.⁴⁹ Debates continue on military operational use (drones-versus-manned aircraft, counter drone technology⁵⁰), and political-ethical concerns.⁵¹ The Ukraine's BRAVE-ONE initiative rallies various public and private entities to accelerate innovation and production at scale.⁵² Drone technology dovetails with AI and networked information systems such as Ukraine's Delta ecosystem and Kropyva app⁵³ to enable complex operations.⁵⁴ Zooming in on the Netherlands, we organise our results on multi-organisational collaboration in two themes: Ambitions and Foundations.

Theme 1: Ambitions

In ecosystems, a myriad of organisational and collective ambitions come together. The rapid evolution of drones implies considerable ambiguity which sometimes translates into a blame game amongst actors: ‘if only the military would articulate their demand,’ versus ‘if entrepreneurs would take risks.’ Like other technologies, the rapid evolution of drones requires new institutional patterns to deal with ambiguity and agendas across organisations. *Policy makers* seek to combine NL MoD interests with wider societal and industrial benefits, such as defence capabilities, resilience, national strategic autonomy of the Netherlands/EU, un-sourcing from Asia and fostering dual use. The Netherlands focuses on key technologies for defence-economic purposes: intelligent (unmanned) systems, sensors, smart materials, space and quantum technology. Concerns pop-up with respect to resilience of a hyper-efficient, connected society. Ideas emerge to promote (licensed) manufacturing in Europe. Strategic dilemmas are being confronted: how to avoid massive stocks while ensuring readiness; how to enhance autonomy while leveraging international specialisation and collaboration; how to achieve collective goals while organisations pursue their own interests; how to align industry policy with investments in research? *The military* is refining its insight in how to use drones in new networked modes of operating.⁵⁵ Their ambitions stem from experimenting and learning (in)directly from the Ukraine experience. Some call for longer term, abstracted thinking about desired technology effects. The Dutch military use of drones differs from the Ukraine: a lower volume is strived for, as well as continuous updates to product design and capabilities to produce at scale when needed.⁵⁶ *Industry* consists of multiple organisations, some already involved in delivering drones to Ukraine. They have the ambition to be technologically cutting edge and ensure supplies of parts. Companies are interested in drone-related opportunities but attentive to risk, willing to work with the military but getting sometimes confused by the network of different intra-NL MoD units, procedures, regulations and decision-making authority. NL MoD demand for drones does not suffice for a long-term defence drone ecosystem, necessitating additional business opportunities. Companies may join in international tenders for (military) drones. To become vibrant, the ambition of the ecosystem is to attract capital, rally partners, and attract international customers.

Theme 2: Foundations

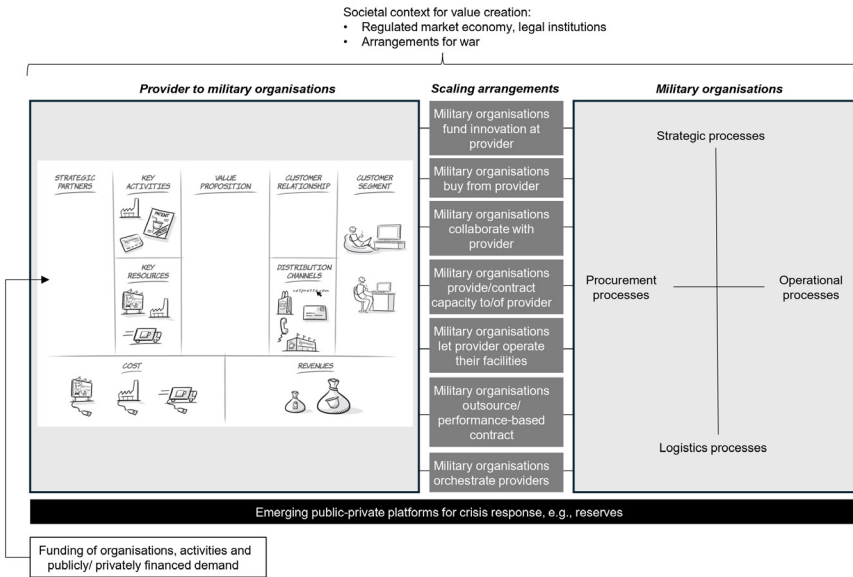
The NL mid-range Unmanned Aerial Systems ecosystem is in the making. We elaborate on *multiple exchange relationships* to understand foundations of multi-organisational collaboration.⁵⁷ Strategically, two *visions on government* are at stake:

entrepreneurial or market failure based government.⁵⁸ The former seems more conducive to ecosystems: considerable funding is made available by the current cabinet.⁵⁹ *Internationally*, the Netherlands is involved in the Ukraine European Peace Facility, the international drone coalition, the drone aid collective, and manufacturing freedom.⁶⁰ Considering present Dutch *government and politics*, the Dutch government is now spending at least 2% of GDP on defence, codifying it in national law. NL MoD is encouraged to invest in new capabilities via the Security Fund.⁶¹ The SecFund will focus on dual-use products. These products can have both civilian and security applications. For example, technology that can make installations low-noise. These applications lead to quiet factories and furthermore to drones creating less noise. Another example is LiFi: a new generation of data transmission, which is faster than WiFi and can transfer more data per second.

The political climate remains uncertain, however, with pressure on health care and infrastructure for instance. For drone production, the NL MoD seeks cooperation with the Ministry of Economic Affairs and wrestles with tight laws and regulations pertaining to national airspace. *NL MoD* strategically articulates its drone ambitions (e.g., national drone plan), and demand, pushing multiple innovations across its operational commands. It is structured according to a governance model separating ‘directing-organising-execution’.⁶² A new combined strategy is developed for knowledge (SKIA) and industry (DIS),⁶³ providing an explication of NL MoD’s focus. Multiple layers of the NL MoD organisation need to be involved in and approve a new way of relating to industry. Specifically, policy is developed directing COMMIT to develop the drone ecosystem. Science & Technology invests in drone-related innovations, e.g., National Technology Programs, unsolicited proposals. RNL Army participates in ecosystem development and experiments within its brigades. FRONT acts as a central innovation hub in cooperation with COMMIT, the latter being under pressure to scale up across a wide range of assortments. An NL MoD-wide expert community is in the making to channel scattered efforts, in addition to RNL Army’s Taskforce drones.⁶⁴ Overall, from within and outside NL MoD, drone activities seem quite fragmented and experimental. NL MoD relates to *industry* in multiple manners:⁶⁵ buying off the shelf products, innovation-subsidy and co-development. Drones are cyberphysical systems with various payloads and functions. Hence, manufacturing requires integrated efforts by the drone industry, production partners, and AI companies.⁶⁶ NL MoD faces an institutional choice: configure as a transactional buyer-supplier relationship, or try out an effect-oriented focus on evolving customer demand.⁶⁷ For the latter legal regulations seem to offer sufficient options.⁶⁸ Also, a more extensive interpretation of so-called article 346⁶⁹ is advocated, with market consultation before parties can access the ecosystem⁷⁰. The drone ecosystem represents institutional renewal for NL MoD: different ways of relating to industry; see Figure 4.3 where we relate these to providers’ business

models. For instance, in addition to just buying integrated products, services or solutions, NL MoD could buy the right to use capacity, or it could arrange for militarising sites, resources or workers. More complex and reciprocal give-take relationships could emerge with new ways of financing. As Figure 4.3 shows, we also distinguish a societal context for NL MoD – business exchange (top), and emerging platforms for public-private cooperation (bottom).⁷¹

Figure 4.3. Exchange models for configuring NL MoD – industry relationships for the drone ecosystem



Business model canvas figure adapted from: <https://sidlaurea.com/wp-content/uploads/2015/10/visual-business-model.jpg>

NL MoD is used to dealing with big OEMs, like Boeing, Lockheed, Rheinmetall, not a consortium of SMEs still developing its industrial base and lacking a lead integrator. Moreover, NL MoD and companies struggle to arrange for (pre)financing, to decide on short (annual) versus long-term (7 years) contracts, and to leave room for entrepreneurship without incurring too much corporate risk.⁷² Pre-financing is important to tier 1 suppliers to engage their tier 2+ supply base. While many financial actors have banned defence investments from their portfolio, some re-legitimise these options and get on board. Still, investors consider drone-investments risky, with appreciation for dual use drones (not a priority for NL MoD). With the present Ukraine war, industry receives major, ongoing orders. This may change with a possible ending of this war, requiring new exchange models.

Finally, considering *tripe helix*, ASML and ‘Nederland Radarland’ are often mentioned as successful Dutch ecosystems – ‘gouden driehoek’ – involving government, industry, and academia.⁷³ This variety of organisations relies on various mechanisms to innovate, produce/sell and use complex technology. Achieving such ‘clockwork’ represents an intricate process of channelling energies, linking agendas and dealing with risks.

Managerial and research implications

We elaborate on implications for management and research using three themes.

Desirable ecosystem flows

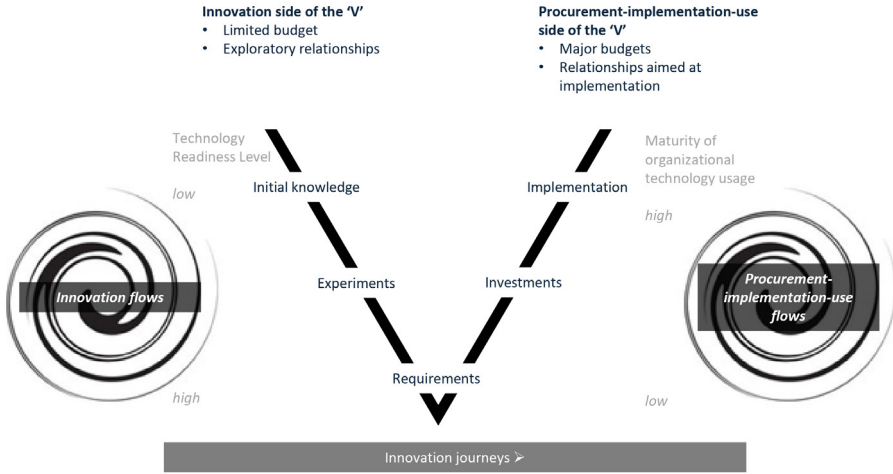
While our initial understanding of upstream scaling tended to focus on bottlenecks (see also Figure 4.2), a more strategic perspective emerged starting with ambitions. Linking with a biological interpretation of ecosystems, we propose a focus on desirable flows as a holistic concept (e.g., the Ukraine war has activated a massive flow of weapons, ammunition, innovation and production). Upstream scaling consists of persistent flows of innovation, and partially latent flows of materialising these innovations in for example the latest drones, and production at scale. These flows resemble for instance fast fashion and innovative products with extremely low life cycles.⁷⁴ The military has an interest in receiving the latest, receiving it on time, at scale when and as long as needed. This suggests closely interlinking innovation and procurement-implementation-use, often called the V-model.⁷⁵

The ecosystem must accommodate ongoing flows (e.g., dual use goods) and latent flows that can be activated when a crisis hits. This could include cross-sector exploring of opportunities to connect flows in new ways and learn from each other.

The volume and continuity of military demand depends on conflicts, reciprocally linked to downstream scaling.⁷⁶ In other words, downstream crisis response – services aimed at restabilising a society once a crisis hits⁷⁷ – dovetails with upstream demands for products and services. Military flows dovetail with commercial firms (grow a business) and academia (cutting edge knowledge). Strategic autonomy suggests activation of flows within the bounds of a national or European system, rather than relying on global value chains. An entrepreneurial process of effectuation, leveraging customer demand, is strived for to harness and link the flows mentioned.⁷⁸ Regardless of who does what, continuous developmental processes are called for, concerning military operational concepts, product-service development, and materialisation capability. Moreover, generative processes of (distributed) entrepreneurship could rally communities and activate

demand-capability pairings in new ways. Researchers could expand on flows relying on for instance Complex Adaptive Systems (CAS) theory.⁷⁹

Figure 4.4: V-model for innovation and procurement-implementation-use



Governance of ecosystems

How can flows be facilitated or even governed? Governance concerns the use of institutions and structures for decision making and give-take allocation.⁸⁰ A decision making structure must be put in place in the respective networks that can quickly determine and update solutions for governance problems in a situation in which activities need to be greatly amplified. This requires practices within and outside of NL MoD to be institutionally changed. As the flows of the military-oriented ecosystem suggest, ambiguity plays a key role. With respect to the governing locus of control,⁸¹ various themes could be examined (see also Figure 4.3).

- *Innovation* could rely on NL MoD subsidising or collaborating with business/academia regarding projects or hubs, including incubator or replicator-like initiatives.⁸² This could complement intra-NL MoD research and development. New financing sources could be explored to pull in resources.
- *Production* is important for scaling. It concerns the ability to translate new concepts into usable products – rapidly and at scale. Application of flexible manufacturing techniques,⁸³ intense collaboration and testing are undergirding this ability, with background laws stipulating implications of formally declaring a war. New legislation is in the making to arrange for grey zone phases.⁸⁴ The extent to which NL MoD has a say in which situations and contexts remains

challenging. Scaling might require new investments, which might create pressures to more vertically integrate production. As we have seen during the Covid-19 pandemic and documented for the U.S. in WWII, opportunistic behaviour leads to misuse of these dependencies and corruption.

- The state might *configure* its relationships with industry, e.g., stepping in with financial guarantees for crucial producers. To limit uncertainty and make it attractive for companies to contribute, a rich array of trajectories is possible. Traditional buyer-seller relationships are probably not sufficient. With respect to ownership, NL MoD could own production facilities, while allowing for non-military use (e.g., Eindhoven airport) or letting business operate its processes (LCS Soesterberg). Or NL MoD combines its own facilities with business facilities (e.g., Scania contract). Conversely, NL MoD could buy the right to use capacity, reduce partial risks as a supplier, or become a strategic customer of one or more providers that has priority service levels (e.g., NL MoD and ‘relatieziekenhuizen’, ‘trekkingsrecht’⁸⁵). Production is likely to be highly flexible (including a patchwork of various sites – licensed – additive manufacturing and postponement⁸⁶), relying on multiple supply chains, and undergoing frequent, severe testing. A solid body of industry is needed with actionable capabilities. Choosing and adapting these trajectories is an evolutionary process. Various risks can be identified which can be problematic for NL MoD. Research could explore the extent to which organisations are granted room for experimenting, and how collective-individual performances can be ensured.
- Another research topic is how innovation/ production ecosystems can be *facilitated* and the networks in them governed over time, acknowledging mutual dependencies.⁸⁷ Industry dynamics may include successful SMEs being acquired by for instance OEMs.

Ecosystems and intra-organisational processes

Ecosystem activity and network governance relate to organisation-internal and external worlds. Heterogeneity of ecosystem partners and intra-organisational complexity of large organisations increase chances of misunderstanding. Acting in ecosystems and networks creates new challenges for organisations to effectively and efficiently connect internal structures and processes. With respect to NL MoD, the organisation has been used for efficiency, long life cycles, and bureaucratic separation of processes and roles for accountability. The present era challenges these internally institutionalised patterns, disrupts inter-unit/level communications, and increases the volume of work. The resulting tension can be noted at for instance COMMIT, expected to combine volume, quality, and innovation. Policy makers are under pressure to not only come up with new strategies and act in the political arena, but to also strategically control

effectuation. Policy-execution and innovation-investment dichotomies are palpably being challenged. Military commands are under pressure to develop new practices and doctrines for new technologies such as drones. Hence, units and layers within NL MoD feel the pressure to change and relate in new ways to their internal counterparts.

Conclusion

This chapter has examined upstream scaling, focusing on the industrial base supplying security operations. Rapid and significant geopolitical shifts in Europe and the wider world ask for a fast increase in military capabilities of European countries – including the Netherlands – after more than 30 years of shrinking capacities. In addition, fast technological advancements regarding digitalisation, AI and cognitive warfare lead to new combinations of mass production and knowledge development. Next to shrinking military capacities, the Netherlands has also developed into a highly digitalised-networked and international economy, and a society with high (international) division of labour and a small production base in manufacturing of goods relevant for military capabilities. This new situation requires a profound re-arrangement and organisation of knowledge development, transfer and production of such goods and services. Given that situation, it does neither seem wise nor feasible to try to produce, buy and store defence related products on a massive scale. Rather, we should focus on developing a system consisting of multiple exchange relationships between NL MoD and industry that can be scaled over time, rapidly if needed in a crisis. These exchange relationships differentiate products, services, capabilities and resources to optimise security, societal and business interests.

Our objective in this regard is to develop and validate a framework for fostering strategic thinking about upstream scaling for defence. We base our analysis on relevant theoretical approaches and the drone ecosystem case study in the Netherlands. Our analysis shows that the Dutch government, the NL MoD and relevant companies have started with this process, but that they encounter numerous difficulties. These range from a lack of organisational capacities especially regarding personnel at NL MoD as well as relevant and potential producers, to a lack of transparent and clear governance of innovation and production networks. We argue that there is no solution that fits all situations and contexts. Rather, it is important to develop a decision making platform. This enables identification of core characteristics of the goods and services that need to be produced and potentially scaled and the current underlying and best future structures for scaling. Ideally, the production systems can switch their governance according to what is most efficient and effective given the type of good or service needed and the respective situation.⁸⁸ Knowledge intensive goods and services for example are likely to be produced most effectively in more

horizontal (network) governance arrangements, relying on decentralised, lateral communications among organisations.⁸⁹ High volume goods are best produced in a combination of markets and hierarchical governance.⁹⁰ In grey crisis situations, innovative arrangements are called for; this may prove challenging due to (intentional) disruption of infrastructures, with an emphasis on product-service innovation, minimised disruption, and actionable scaling capabilities. When crises situations kick in, rapid scaling is called for. In these cases, more hierarchical, centralised and directive governance is likely to be more effective.⁹¹ The role of government actors (Ministry of Defence and Ministry of Economics) is crucial but needs to be adjusted accordingly. For now, what is therefore needed are interventions to develop the current systems and latent systems for rapid further scaling. Within political-societal bounds, this requires foresight, strategic capabilities and long-term commitment from policy makers and companies alike. At the moment, European leaders explore quite disruptive change to improve European standardisation and scale.⁹² This will demand homogenisation and industry cooperation. In this emerging context, the NL drone ecosystem could position itself on the supply and demand side and thrive.

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Notes

- ¹ This chapter is linked to the S&T project *Defensie scaling capabilities* awarded in 2024 to Netherlands Defence Academy and Tilburg University.
- ² <https://www.nytimes.com/2025/01/04/world/europe/nato-attacks-drones-exploding-parcels-hybrid.html>
- ³ Crises could be predicted to some extent, allowing ample time for societal, governmental and industry-level switching and preparation. Realistically speaking, such processes constitute complex transformation processes as illustrated by for instance the climate crisis, undesirable international dependencies, societal resilience, and ‘peace dividend.’ W.T. Johnsen, “NATO strategy in the 1990s: Reaping the peace dividend or the whirlwind?”; R. Bertrand et al., “Uphill battle: Military organisations’ reporting on environmental sustainability performance”.

- ⁴ H.J.T. Zijderveld and J.P. Kalkman, “Emergent organizing: Origins and evolution of temporary crisis response organizations”.
- ⁵ M. Singer and P. Donoso, “Upstream or downstream in the value chain?”
- ⁶ J.S. Meiter, “Network enabled capability: A theory desperately in need of doctrine”; P. Kenis and J. Raab, “Back to the future: Using organization design theory for effective organizational networks”.
- ⁷ Heterogeneous concerns the types of organisations: public, private.
- ⁸ We refer to capabilities (processes) aimed at managing technical resources (such as weapon or energy systems), such as acquiring, bundling, and using. D.G. Sirmon, M.A. Hitt, and R.D. Ireland, “Managing firm resources in dynamic environments to create value: Looking inside the black box”.
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- ⁶⁴ https://magazines.defensie.nl/landmacht/2024/08/04_cde-apos
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Scaling in unpredictable strategic environments: Reflecting on strategic flexibility from an emergent innovation perspective

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Abstract

Scalability in military organisations is inherently bound to the process of adapting the organisations to remain aligned with contextual unpredictability. In this sense, the strategic challenge of scalability extends beyond the implementation of quantitative scaling mechanisms into the realm of strategic adaptability. In this chapter, we redefine the strategic challenge surrounding scalability for the armed forces and the role of innovation herein. We introduce a model for positioning four mechanisms of scalability in relation to this challenge. Additionally, we use the sociotechnical concept of generativity to reflect on current practices around scalability. We explore the complexity of intra organisational challenges on organising for emergent innovation as a mechanism of change to provide future academic and managerial direction.

Keywords: Socio-technical systems; Generativity; Scalability; Innovation; Emergent organising

Introduction

“We need a philosophy of strategy that contains the seeds of its constant rejuvenation – a way to chart strategy in an unstable environment.”¹ As articulated by Carl von Clausewitz, arguably the most influential thinker on western military doctrine, military strategy is contextually placed in its environment. Should the environment change or, as von Clausewitz suggests, be unstable in its very nature, strategy must allow for adaptability in order to remain aligned with this environment. Over a century after von Clausewitz, strategy scholars at the end of the 20th century like Mintzberg² and Teece³ emphasised the strategic need for organisations to adapt to their environments in order to be successful and the role of emergent insights in the process of strategy formulation. One particular relevant aspect of the modern environment is the speed and unpredictability in which (digital) technology introduces change.

In the last two decades, digital technology has not only permeated business and society, but has also become interwoven within the environment that military organisations operate and the means they use to function in these environments. In fact, military scholars like Bousquet suggest that accelerated by proliferation of digital technologies, unpredictability and complexity have risen to the degree that it dictates a paradigmatic shift in military thinking based on decentralised constant adaptation.⁴ While the aforementioned examples vary in context, approach and are separated by almost two centuries, they are connected in the sense that they stipulate the relation between strategy and environmental uncertainty and the relation between emergent insights and strategic ability to thrive under conditions of uncertainty.

At the same time, geopolitical instability and the ongoing near peer conflict on the European continent impose a renewed emphasis on the required output of military organisations in crisis or war scenarios. In reaction, the Netherlands armed forces have adopted the strategic direction of military scalability. In the everyday reality, military scalability is likely interpreted against the background of the structural and functional boundaries of the existing organisation, reducing scalability to a matter of decreasing or increasing available capacities. The implicit assumption in this type of strategic interpretation of scalability is relative stability or predictability in all other aspects than quantitative demands on the organisation. In this chapter, we challenge this assumption of predictability based on the influence of (digital) technology and the limitations imposed in an environment of resource scarcity. We suggest that the strategic challenge for military scalability is fundamentally a matter of simultaneous quantitative and qualitative flexibility.

This reformulation brings us into the domain of concepts like Dynamic Capability and agility.^{5,6} Dynamic Capability, as an elaboration of Barney's Resource Based View⁷ takes a macro perspective on the processes through which organisations adapt their capabilities. In this context, emergent innovation is commonly positioned as a main driver of the underlying dynamics enabling the organisation to re-align with environmental changes.^{8,9} Scalability innately increases potential for emergent innovation due to the attraction and interaction of heterogenous social- and technical elements from outside of the current organisation. When viewed in the social and structural context of an organisation, the relation between emergent innovation and organisational adaptability becomes inherently complex. The sociotechnical concept of generativity offers an evolutionary perspective on this complex relation between emergent innovation and organisational adaptability.¹⁰

In this chapter, we use the concept of generativity to reflect on practices around scalability in the Netherlands armed forces. Sections 2 and 3 analyse the strategic intent and underlying assumptions as derived from the current strategic narrative and reformulate the strategic challenge of military scalability in the armed forces. Sections 4 and 5 introduce the theoretical lens used to analyse the empirical

illustrations of actual practices around scalability given in section 6. Sections 7–9 synthesise our analysis and conclusions.

Scalability in the armed forces, strategic intent and assumptions in practice

Scalability in the Netherlands armed forces has returned to the forefront of strategic policy discussions for the better part of a decade. Initiatives range from the early isolated experiments at the engineers and logistic branches of the army to the creation of staff sections dedicated to the transition towards scalability and the major policy directive in the 2024 Defence White Paper.¹¹

Earlier initiatives were largely driven by resource scarcity within the organisation and served to fulfil existing needs in a flexible inter-organisational network, but also indicated some potential for inter-organisational learning and adaptation. The latter interpretations and initiatives focus more on adapting to changing demands external to the organisation. The drastic change in the geopolitical and security landscape following the 2022 start of the Ukrainian conflict and resulting focus on (avoiding) major war are keyed as the contemporary driver of the need for a scalable organisation. At this time, scalability appears to be interpreted as the ability to increase or decrease the capacities of the organisation, mainly focussing on integration of tiers of personnel with differentiated flexibility. A cautious parallel may be drawn with the conscript style armed forces during the Cold War, when mobilisable forces provided the answer for demand for increased performance in the eventuality of war.

While scalability is also mentioned as a desired strategic outcome for materiel acquisition (e.g., logistic vehicles) and infrastructure development (e.g., buildings designed with war time specifications in mind), it is less emphasised and less clearly conceptualised. Current operational directives on scalability share an adherence to and reliance on preconceived concepts, dictating functional requirements. This is visible in references to (inter)national doctrines like the NATO Force Model and National Defence Plan. This has resulted in the renewed drive towards mobilisable forces and flexibly sharing resources within security eco-systems.¹²

At face value, the call for scalability in the armed forces appears to reflect a logical answer to the discrepancy between the required output of the military organisation at peace and in times of war. That is, if we assume that the actual desired function and design of the organisation in turbulent environments can be adequately predicted – an assumption of predictability that seems at odds with contemporary observations. For example, in the Ukrainian conflict, various emergent innovations are visible to the external observer.¹³ Insights found in experiments like drone warfare appear to foster innovation driven change in the very conflict that accelerated the drive towards scalability.

From a strategic management perspective, what is military scalability and what challenge needs answering?

Adapting to an (un)predictable environment

We previously proposed scalability as the strategic ability to re-align capabilities and capacities with fluctuating external demands. However, as seen in the strategic narrative of the armed forces, military scalability is predominantly interpreted as quantitative scaling of the organisation. Implicitly, this interpretation of scalability assumes that how the organisation works today is sufficient to reach its desired goals in the future, which is only relevant if the environment is stable and predictable; this is an assumption that is empirically challenged by the very driver of scalability in the first place, a systemic change in the required function and output of the armed forces incentivised by the Ukrainian conflict. In academic literature, today's environment is in fact often assumed to be Volatile, Unpredictable, Complex and Ambiguous (VUCA)¹⁴ by nature, an assumption that has been widely accepted by military scholars as well – but interpretations vary on how to deal with this uncertainty. In addition, we deduce two interrelated theoretical arguments pointing towards the prevalence of unpredictability and the need for innovation and adaptation in scalability: the influence of digital technology on unpredictability and the implication of scaling within an ecosystem of limited resources.

Quantitative scaling: ecosystems of limited resources

Resources (e.g., Human capital), that represent the physical elements of a scalable organisation, do not materialise out of a vacuum when mobilised into the military organisation. If we suppose that these resources (e.g., employees) are also part of other organisations or ecosystems, redistribution of those resources into military service implies a (temporary) detraction of resources from their parent organisation. Under the condition of limited resources, this can be regarded as a zero-sum interaction, meaning that one organisation's gain is another organisation's loss.

Abstracted, we divide methods of scaling an organisation's output in four distinct but not mutually excluding categories into our own model of resource mechanisms of scalability. The model draws upon the RBV main idea of heterogeneously distributed scarce resources¹⁵ and change in the primary process as predecessor of organisational structure design according to organisational design theory.¹⁶ The first mechanism is optimisation, by internally reallocating resources to the existing primary process of value creation. Examples are deploying officer cadets that are still in training into field service and reassigning staff from supporting functions of the organisation into operational functions. The second

mechanism is transformation, in which changing the way in which value is created with existing resources leads to a different output. Examples can be found in the creation of new concepts, like the conception of manoeuvre warfare as opposed to attrition warfare. Thirdly, one could repurpose external resources to contribute to the existing structure of the armed forces. This is what mobilising flexible tiers of personnel and outsourcing activities does and is in essence the claiming of priority in a zero-sum division of relevant resources. The final approach is the creation and utilisation of synergy through innovation between internal and external resources, increasing the total value or output of relevant industry resources through new ways of creating value; therefore, enabling increased output of the armed forces, but not necessarily at the cost of the entity those resources are drawn from.

Table 5.1: Mechanisms of resource-based scalability

	<i>Locus of interaction</i>	<i>Interaction with ecosystem</i>	<i>Change in primary process</i>
<i>Optimisation</i>	Internal org.	N/A	N/A
<i>Transformation</i>	Internal org.	N/A	Large
<i>Zero-sum exchange</i>	External org.	Negative	Small
<i>Ecosystem synergy</i>	External org.	Positive	Large

A zero-sum approach to resource (re)distribution is, to a large extent, how scalability is interpreted in practice today. Although the eventuality of war might indeed necessitate a shift in societal priority towards the armed forces, it is likely that a significant amount of those resources is critical to national security and the function of the military organisation in their original capacity as well (e.g., judicial, economic, or infrastructural security). What makes this even more complex is that the relative importance of these functions in society to security is dynamic; an example would be the recent increased relevance of digital infrastructure for national security and military organisations. Essentially, using a zero-sum exchange mechanism for scalability influences the ecosystem it interacts with negatively.

Ecosystem synergy is the most elusive mechanism, but at the same time the most promising in terms of answering the overarching need of the security ecosystem. When utilisation of external resources enables additional ways of creating value for all parties involved, not only is it theoretically possible to increase or decrease the output for the armed forces, but it may benefit society as a whole. Examples of this would be scaling through military-industry innovation networks, like the Ukrainian BRAVE-ONE initiative. In BRAVE-ONE, drone innovation, production and doctrinal experimentation are supposed to yield increased value for all parties involved.

As visible in Table 5.1, utilising resources external to the current military organisation may lead to positive or negative effects on the resource base of the surrounding (security)ecosystem. In the case of zero sum, mobilising resources detracts from the surrounding ecosystem, which in itself can be regarded as a changing role of the armed forces relative to society. In the case of synergy, the relation between the armed forces and the involved organisation itself is the locus of change. This means that the very concept of scalability through external interaction challenges the current relation of the way the armed forces work in relation to their environment and underscores the need for adaptation and change.

Qualitative change, digital technology driving potential for disruptive change

Technological innovation appears to be the most prominently self-adopted path towards change between the armed forces and the surrounding industry in general.¹⁷ Invention and production of technological artifacts is most commonly placed outside of the military organisation, making the role of technology in military innovation strategy a logical result. We argue that the influence of digital technology as an accelerator of emergent innovation is not only relevant as a mechanism of adaptability, but also greatly increases the probability for unpredictable change in the environment.

More specifically, the generative character and innate ambiguity of what digital technology means in a future operating environment complicates prediction. Large military weapon system implementation often follows technological determinism logic, in which the invention of new technology dictates organisational change. However, it is not uncommon for digital technology to be used in ways beyond its original design. Thus, we use Orlikowski's central idea based on structuration theory that "*technology is understood as a social object whose meaning is defined by the context of use.*"¹⁸

Digital technology in particular, is not only open for interpretation but allows for a large degree of recombination due to its digital properties. Familiar examples would be the amount of uses that spawned from smart phone proliferation, high bandwidth cellular networks and the availability of GPS signals. These different innovations have an influence on several aspects of military organisations, like security considerations, monitoring and influencing social structures, new possibilities for command and control or disruptive targeting methods. Digital technology is often regarded as generative, in the sense that its combinatorial potential may accelerate unprompted change in sociotechnical interactions that in turn can fuel further innovations.¹⁹ Combined with the trend of increasing proliferation and permeation of digital technology both in the military organisation and in society as a whole, it becomes increasingly difficult to predict the impact of technology on the military organisation.

While acknowledging that strategic uncertainty resulting from unpredictability of digital technology impact is potentially threatening for a military organisation when disregarded, we point out that it can also be a great source of innovation. Being more effective in devising and capturing new innovative uses of technology may bring decisive advantages to a military organisation. For example, the Ukrainian use of algorithm driven allocation of fire support positively contributed to fire support functions, but required a restructuring of the process involved. It included targeting data provided through a publicly available smartphone application, expanding the primary process of targeting. In order to harness this kind of innovative potential, the organisation must be able to re-organise itself around these emergent innovations.

Strategic paradox, reformulating the challenge

Even in an unpredictable, complex environment, choosing to assume validity and stability of the current organisational design in the future does undeniably have its merits; mainly by reducing uncertainty and avoiding the problem of designing an organisation without knowing its building blocks and their relations. In the context of a military organisation, banking on robustness and interoperability with allied forces may even justify imposing boundaries on scalable organisation design.

However, both quantitative and qualitative aspects of the environment necessitate a mechanism through which these boundaries can be challenged and revised if deemed necessary. It is from this paradox between the suboptimised, but practical, merit of simplicity and the theoretical but potentially critical risk of not being able to adapt and learn from interaction with the environment that a revised strategic challenge regarding military scalability is drawn: *'How to design a bounded scalable organization, that allows for emergent adaptation within the organization in order to remain aligned with unpredictable, fluctuating environmental demands and opportunities.'*

From resource based view to the concept of generativity

The strategical need for an organisation to adapt itself and its resources in order to strategically (re)align with changing environments is, in itself, not a new phenomenon. Academic attention towards this topic spans across macro-economic perspectives like Barney's Resource Base View (RBV)²⁰ and the role of underlying micro dynamics like emergent innovation. Both ends of the spectrum use the case of military scalability. The more macro perspective of the RBV can be used to interpret system level compositions, as we did in our resource-based model of

mechanisms for scalability. The more micro dynamic theories provide insight into how adaptation might emerge from within the organisation.

Barney's 1991 work on the relation between firm resources and competitive advantage laid the foundation for the Resource Based View. The core idea of RBV is that resources are distributed heterogeneously amongst organisations and that the possession of relevant resources and the way in which they are configured allow an organisation to be strategically competitive.²¹ According to Barney, an organisation's resource base is not limited to amount or type of individual resources, but extends to composition and integration of resources within the organisation. In other words, how the organisation uses those resources to create value. This implies not only a quantitative, but also a qualitative dimension of RBV, as we implemented in our aforementioned model.

As an extension of the RBV, Dynamic Capability scholars study the process by which organisations alter their resource base and its relation to competitive advantage in unstable environments.^{22,23} What these concepts have in common is their conceptualisation of sensing and seizing of threats and opportunities by changing or rearranging the resource base of an organisation. From a systems perspective, this conceptualisation appears to be prevalent in literature.

Linking non-linear mechanisms to dynamic capability

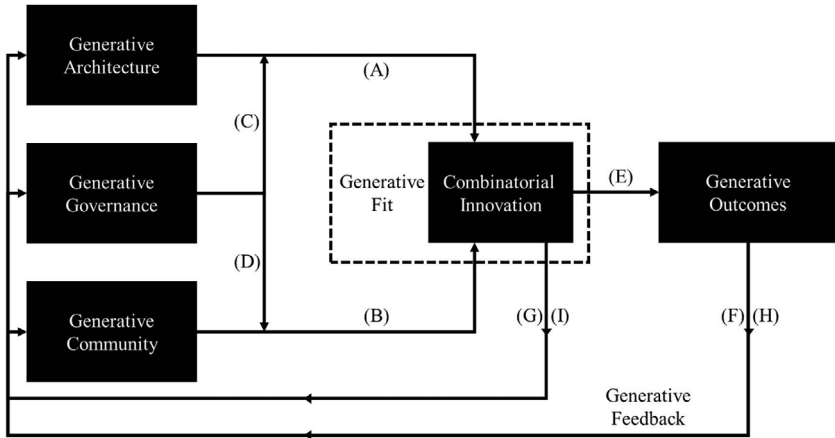
The system perspective on dynamic capability lacks a certain degree of insight in the underlying micro dynamics of the adaptive process itself. It does not relate to causality or *how* adaptation mechanisms come to be. Although these mechanisms can, from an ex-post systems perspective, appear linear and pre-conceived, the adaptation or innovation often has a more generative and non-linear character, especially with the increasing proliferation of digital technology.²⁴ This generative character of digital technologies increases the complexity of predicting technology affordance²⁵ which in turn is interdependently amplified by the social system of an organisation, adding contextual experience and interpretation at multiple levels.²⁶ This suggests that in order to exert some measure of control over this non-linear adaptation, for instance in the design of a scalable organisation, we need to be able to articulate and to some degree understand the underlying complexities.

Generativity as a sociotechnical concept driving change and innovation

A different view on non-linear adaptation that fits a VUCA environment is the concept of generativity. The concept of generativity is an evolutionary perspective on the sociotechnical complexity surrounding emergent innovation. This concept regards the interaction between an organisation's social and technical elements as

the mechanism leading to emergent (re)combinatorial innovation as a source of variation and innovation. Resulting outcome feedback loops contribute to selection and consequent retention in the sociotechnical system, specifically in architecture, governance and community.^{27,28}

Figure 5.1: Thomas & Tee's model of generativity



This feedback resulting from emergent innovation and generative outcomes is an essential part of generativity in the context of dynamic capability, mainly because generative feedback can enable both conscious and unprompted adaptations in the organisational resources and design. Thomas & Tee²⁹ conclude that there is no consensus in the literature on how generative feedback is or should be processed, it merely states its existence and importance.

The concept of generativity discerns three categories that comprise the social and technical elements of the organisation: generative architecture, generative governance and generative community. Generative architecture entails the technical elements of the organisation, including its structure, processes and routines. More generative composition of architecture would be including characteristics like malleable, granular and loosely coupled architecture. Generative governance is referring to the amount of access to or control over information, technology and interaction that elements within the organisation possess, and boundary resources. Generative community is representing the human or social aspect of the organisation and is presumed to be in open exchange with the environment.

As a construct, generativity is mostly viewed in the context of digital innovation and IS research,³⁰ which may be explained by both the salience of generativity in modern digital industries (e.g., digital platforms) and scholarly notions on the innate generative qualities of digital technology.³¹ However, proliferation and

permeation of digital technologies in business and society alike strongly suggests that generativity stemming from the use of digital technology is not limited to these 'digital' organisations, but is likely to be present in organisations across the board.

What do observations of current initiatives on scalability show us?

Multiple observable experiments and attempts at implementation of military scalability are currently enacted in the Netherlands armed forces. Some of those are structurally embedded and top-down initiated, while others are more unprompted initiatives from within the organisation itself. We incorporated four observations, drawn upon publicly available data and informal interactions with agents involved in these scalability initiatives to illustrate the broad strokes of practice and on scalability in the armed forces. Due to the apparent methodological limitations, we use this to identify general trends and dynamics that can be reflected on more abstractly. The top practices describe the more structural, formal organisational initiatives regarding scalability. The latter practices focus on the emergent, informal initiatives around scalability.

First of all, it is important that scalability has been salient at operational and work level for almost a decade in emergent initiatives (e.g., Logistic branch partnering with industry & Total Force Engineers). During this earlier period, there has been little strategic level attention to scalability. Now that scalability does permeate strategic policymaking and is being implemented top down, we will discuss two specific practices, the proposed HR revision for scalability and the CDS Transition team scalable forces.

Strategic HR transition towards scalable forces

The most prominently presented and interpreted outing of scalability appears to be the HR transition. In essence, it is a revision of the closed, professional soldier focussed, HR-model towards a flexible HR model based on four incremental flexible and external tiers of human capital. Tier one is comprised of predominantly fulltime military personnel, occupying positions in the 'operational domain'. Tier two consists of a mix of civilian and military fulltime personnel active in supporting functions that do not directly deliver military output. Tier three is the mobilisable force. Tier four is the interorganisational cooperation with society and industry partners for services or goods that the armed forces are unable or unwilling to provide.³²

The basic premise behind the four tiers is backfill from higher tiers to lower tiers. The actual potential or way in which tier four adds to the scalable output in this model is less explicitly articulated and more directed towards interdependent networks.

Implementation effort: CDS transition team

The CDS transition team is a specific unit tasked with enabling the transition towards scalable armed forces. Its role is characterised as “accelerating, uniting and critically reflectional.”³³ The team is structurally embedded within the Defence Staff, which means in terms of governance it is located at operational level. Efforts of the transition team range from defining and proliferating a unified interpretation of scalability throughout the organisation to accelerating cultural shift towards scalability. Example remarks such as “Bottom-up lack of momentum and top-down immaturity of initiatives” are articulated as perceived problems with implementing scalability.³⁴

Digital infrastructure modularity

The openness of digital infrastructure within the armed forces is, understandably, a topic of debate due to security concerns. Common design logic in military communication systems is based upon system compartmentalisation and pre-determined functional relations. While probably not representative for all digital infrastructure, first attempts at changing this type of logic appear under the umbrella of the ‘Information Driven Operations’ initiative. Part of the design philosophy of the FOXTROT programme for instance, is the principle that communication devices should be modular by design in order to accommodate the possibility of redesign of the organisation and subsequent information exchanges.³⁵

The emergence of ad-hoc networks

At work level, several emergent pockets of innovation and experimentation can be identified regarding scalability, the engineering branch of the army being one of the more prominent ones operating under the label of Total Force Engineer. These initiatives take the form of integrating mobilisable forces into command structures, but also strongly apply methods of ‘building interorganisational networks’ like starting ‘military-industry business clubs’ and initiate discussion on how cooperating with partners could influence operational processes and structures.³⁶ It is noteworthy that while direct supplementation or substituting military capacities with capacities from civilian partners participating in these networks is still one element, these networks are not built upon transactional relations. Moreover, the amount of effort dedicated towards the generation and sustainment of these networks suggests that quality of relations and interdependent military-industry development of value might form a structural element of these networks.

Other innovation initiatives that incorporate elements of scalability are the experimentation of manoeuvre units with the new technology in order to multiply

output within the current production process. An example would be the informal division of recon units of the 13th medium brigade through substituting parts of their operational process with drone technology.

Although varying in form and function of adaptation, it appears that all these initiatives share the fact that they remain contained within their respective functional boundary of the organisation. This is exemplified by the remark of one of the founders of the Total Force Engineers that they deliberately keep ambitions within the bounds of their own control, which are limited by the structure they are in.³⁷

What trends do we infer from practice?

Contradictory interpretations of the role of innovation in scalability

When we consider all initiatives, we observe opposing movements between organisational levels. At strategic and operational level, both the HR revision and the CDS transition team appear to consider the top-down organisational change towards scalability as the main focus of innovation. The methods through which they envision scalability to be realised closely resemble optimisation and zero-sum exchange in our resource mechanisms model of scalability. This is most visible in the 4 tier HR-model, that almost exclusively focusses on supporting the current primary process with internal and external resources. Although the mission statement of the CDS transition team would suggest a more transformational focus, their structural embedding in the organisation indicates a possible lack of strategic discretionary flexibility needed to enact the structural change this would require. Interestingly, the CDS transition team point to a lack of momentum of bottom-up initiatives and the immaturity of top-down guidance as one of the main problems.

At work level in the organisation, an opposing trend can be observed. The emergence of ad hoc networks and innovation pockets explore the possibilities of transformational change and synergy. These initiatives adhere to an attitude of 'learning by doing' as a method of informing further action. In this context, innovation can be regarded as the means in which potential for scalability can be discovered. The required organisational change is a resulting step of implementation. Within their structural boundaries, both the ad-hoc networks and pockets of innovation show a tendency towards malleability and flexibility, which is reflected in the focus on innovation and relational interaction. A noteworthy example is the FOXTROT program, which is actually a rather large and top-down initiated communication system procurement program. In the FOXTROT program, local interpretation of the strategic challenges of the armed forces led to designing modularity and granularity into the procurement of new communication devices. In

itself, this is not special. However, the intended possibility of recombining systems into unforeseen configurations enabling future operating concepts is. Although it may not be effectuated, the FOXTROT program shows a degree of architectural malleability that exceeds current structural boundaries. This architectural allowance for recombination was mitigated by governance boundaries that could be easily lifted should the organisation choose to.

Strong interaction between organisational structure and innovation

The interaction between the current organisational structure and attempts to implement or experiment around scalability are very salient and appear to mitigate innovative adaptation. At lower levels of the organisation this is visible in the self-imposed boundaries of initiatives at their respective level, which are perceived as necessary limits in order to ensure feasibility of the experiment itself. At more strategic levels, this effect appears to be even more pronounced, with a strong focus towards optimisation of the current structure. Furthermore, as expressed by the CDS transition team, bottom-up initiatives and strategic level concepts appear to lack interaction in the current organisation.

Discussion and conclusion

We started this chapter by deconstructing military scalability and exposing basic assumptions on stability of the environment in current military practice. Adopting a RBV perspective, we developed a model integrating mechanisms of scalability with need for innovation. Under the assumption of a VUCA environment, where digital technology drives uncertainty and accelerates potential for uncertainty, we learned that for organisations to scale using external resources, innovation is a key enabler. Using our theoretical lens of generativity theory and the RBV, we reflected on the observed dynamics, conceptualising the strategical adaptivity and flexibility challenges of military scalability. The following paragraphs aims to contribute to a refocussed strategic interpretation of scalability by presenting our two key findings, managerial implications, and further avenues of research.

Military scalability in VUCA environments requires innovation as mechanism of adaptation

Military scalability is not just about increasing or decreasing the scale of available capacities, but also about the ability to adapt the form and function of the scalable organisation itself. The environment possesses a degree of unpredictability and

complexity that diminishes the ability to predict effective functional design of a scalable military organisation. A major contributor to this unpredictability is the proliferation of digital technology and the resulting decrease in predictability of affordances. Innovation as a mechanism of adaptation can support the military scalable organisation in remaining effective in a VUCA environment.

The current organisation shows a bias towards more conservative interpretations of scalability, focussing on internal optimisation and external zero-sum exchange. Both these mechanisms are less suited to contribute to adaptability in uncertain environments. However, with the attraction of external resources (e.g., Human Capital) in military scalability, the increase in heterogeneity suggests potential for combinatorial innovation, suggesting possibilities for more adaptable mechanisms.

Innovation as mechanism of scalability is bound by the organisational design of the organisation

The Netherlands armed forces, as an organisation, has its own design logic, processes and structure. From a generativity standpoint, adhering to this logic is inhibiting the ability to adapt to the scalable organisation in several ways.

Firstly, strategic level that has the ability to influence architectural and governance composition is mainly focussed on scaling towards predictable output, using current system logic and boundaries. The need for and potential to innovate and adapt is identified, but conceptualised in terms of quantitatively scaling the existing work structure, which may be explainable due to the difficulty of preconceiving suitable form and function in a VUCA environment.

At work level, experiences are formed while experimenting with different configurations and interactions with external partners, but these do not translate into structural changes and these experiments are constrained by the functional boundaries of their respective part of the organisation. From a generativity standpoint, this dynamic is prevailing; the interaction between the social and technical elements of the organisation at work generate outcomes and feedback that can be interpreted and used to inform strategic choice (e.g., redesigning work structures). For this to work, feedback from all levels must be able to reach relevant levels in the organisation.

The current organisation of the Netherlands armed forces seems to select and retain feedback based on its current functional structure, suggesting that feedback from sociotechnical interactions may not reach the appropriate levels or be misinterpreted. The architecture of the organisation is in essence not designed to be generative or adaptable. Sequentially, it is inhibiting the feedback necessary to make informed changes to that very architecture. The challenge of realising effective feedback in the scalable organisations therefore means it originates in the

current system, but simultaneously must relate to other levels than current organisational structure allows, without fully being able to predict which levels they are. Merely allowing for information exchange will most likely not be sufficient, due to the influence of structure on selection and retention of feedback.

Generativity, as a sociotechnical concept linked to dynamic capabilities, provides an evolutionary perspective on how interactions within the organisation and its environment may provide unprompted insights needed to align the organisation with fluctuating external demands and opportunities. Following the concept of generativity, a military scalable organisation could be uniquely positioned to utilise emergent innovation as a mechanism of adaptation, provided it allows for feedback to be leveraged into (strategic) redesign of the scalable organisation.

Managerial implications

Shifting the focus of scalability from a quantitative challenge towards a matter of interdependent quantitative and qualitative flexibility has extensive implications for the Netherlands armed forces. First and foremost, reframing the strategic challenge of scalability as a matter of adaptability indicates that it is not merely an issue of implementation. Instead, the organisational challenges expand to the need to connect work level innovations to strategic choice around organisational (re)design. This means that future managerial efforts on scalability should consider the required level of discretionary change in defining the stakeholders involved in scalability initiatives.

Our proposed model for mechanisms of scalability provides a starting point to interpret the potential and required change for these new innovations on scalability, informing strategic decisions on imposed governance and flexibility. Following our model, it becomes clear that innovation and synergetic relations with the ecosystem are both essential in providing flexibility and mitigating negative effects of scalability for the surrounding security ecosystem. We suggest an increase of strategic attention towards the, currently underutilised, mechanisms of transformation and industry synergy for scalability.

One particularly interesting observation that may be used to increase generative potential for innovation, without directly interfering with the current organisational boundaries, is the application of governance boundaries. Designing structural and technical elements of the architecture to be modular allows for future reconfiguration, like modularity of communication systems in the FOXTROT programme. Imposing governance boundaries (e.g., restricting necessary interface protocols) instead of architectural rigidity could enable flexible control on emergence of combinatorial innovation.

Avenues for further research

How to design strategic choice on boundary crossing for innovation in scalability?

In this chapter, we have concluded that boundaries for innovation as a mechanism of scalability are related to organisational design. Further research could focus on the design of the strategic choice on how and when to make changes to these boundaries as part of an iterative process of adaptation.

How to design feedback in the organisational structure for scalable organisations?

The role of feedback as a vehicle of insight and enabler of learning conceptually transcends the organisational structure, but is at the same time strongly influenced by existing structures. In order to inform strategic choice, further research could focus on the question: How can we navigate the paradox of designing feedback that simultaneously shapes, and is shaped by, the organisation?

How to design inter-organisational networks for synergy aimed at scalability in unpredictable environments?

For a scalable organisation to transcend the zero-sum interaction for resources within its ecosystem, viewing interorganisational networks as generative systems can inform network building. Instead of solely focussing on current logical partners, adopt a wider perspective on how these networks interact and create value through innovation and synergy. Further research could expand the concept of generativity towards interorganisational networks and explore the resulting challenges.

Notes

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- ³ David J Teece et al., "Dynamic capabilities and strategic management", 509–533.
- ⁴ Antoine Bousquet, "Chaoplexix warfare or the future of military organization", 915–929.
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- ⁶ Véronique Ambrosini, and Cliff Bowman. "What are dynamic capabilities and are they a useful construct in strategic management?", 29–49.
- ⁷ Jay Barney et al., "The resource-based view of the firm", 625–641.
- ⁸ Bygstad, Bendik. "The coming of lightweight IT".

- ⁹ Thomas, Llewellyn D.W., and Richard Tee. “Generativity: A systematic review and conceptual framework”, 255–278.
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- ¹³ Eric-Hans Kramer et al., “Revisiting the synthetic organisation: Multi-level bricolage in turbulent environments”, 495.
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- ¹⁵ Barney, Wright, Ketchen Jr. “The resource-based view of the firm”, 625–641.
- ¹⁶ Herman Kuipers et al., *Het nieuwe organiseren: alternatieven voor de bureaucratie*, 243.
- ¹⁷ “Strategische Kennis en Innovatie Agenda”, Ministerie van Defensie, geraadpleegd op 1-2-2025, <https://open.overheid.nl/documenten/r0n1-52ed0fc2-bddf-4792-9b95-6b13aco87e95/pdf>.
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- ¹⁹ Youngjin Yoo et al., “Organizing for innovation in the digitized world”, 1398–1408.
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- ²¹ Barney et al., “The resource-based view of the firm”, 625–641.
- ²² Teece et al., “Dynamic capabilities and strategic management”, 509–533.
- ²³ Véronique Ambrosini and Cliff Bowman. “What are dynamic capabilities and are they a useful construct in strategic management?”, 29–49.
- ²⁴ Peter C. Verhoef et al., “Digital transformation: A multidisciplinary reflection and research agenda”, 889–901.
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- ²⁷ Thomas, Tee, “Generativity”, 255–278.
- ²⁸ Jonathan L. Zittrain, “The generative internet”, 1974–2040.
- ²⁹ Thomas, Tee, “Generativity”, 255–278.
- ³⁰ Thomas, Tee, “Generativity”, 255–278.
- ³¹ Yoo et al., “Organizing for innovation in the digitized world”.
- ³² Christophe van der Maat “Een dienmodel dat past bij een schaalbare krijgsmacht”.
- ³³ “Transitieteam CDS: We moeten voorwaarts”, CMC, 25-09-2024, <https://www.cmc-defensie.nl/nieuws/transitieteam-cds-over-de-schaalbare-krijgsmacht-we-moeten-voorwaarts/>.
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Scalable defence infrastructure: Leveraging industrial, flexible and demountable construction and Legolisation for operational flexibility within the Dutch defence organisation

Edwin Dado, Jan Willem Petersen, Sebastiaan Leertouwer, Ruud Moeskops, and Alexander Schmets

Abstract

The Ukraine war has shifted the focus of the Dutch defence organisation from Main Task 2 (promoting the international legal order and stability) to Main Task 1 (protecting national and allied territory), necessitating scalable and adaptive large-scale military infrastructure and facilities.¹ This chapter explores how the integration of Legolisation, and industrial, flexible, and demountable (IFD) construction, as derived from the civilian Building and Construction engineering practice, can address these scalability and adaptability challenges.

Keywords: Large-scale infrastructures; Scalability; Legolisation; IFD construction

Introduction

The war in Ukraine has shifted the operational priorities of military organisations worldwide. For the Dutch defence organisation, this shift has entailed a transition from global expeditionary operations to large-scale combat operations on NATO's eastern border. In this context, scalability has emerged as the leading paradigm.² From a technological perspective, the authors define scalability as the capability of a system to adapt to changes in demand and/or environmental conditions. Applied to a military context, scalability ensures operational infrastructure and support systems are adjusted to meet the demands of varying mission sizes, durations, and operational combat conditions.

Since the end of the Cold War conflict, Dutch military engineers have primarily focused on constructing semi-permanent or temporary infrastructure to support expeditionary missions. This has significantly impacted how military infrastructure is designed. Instead of designing infrastructure for long-term

habitation, the emphasis is primarily on logistical functions and fast deployment and redeployment, often resulting in low-quality infrastructure. These low-quality infrastructures often rely heavily on containerisation and temporary Force Protection (FP) installations. Although the concept of containerisation enhances the scalability of military infrastructure (i.e., stacking containers), it is the result of a political compromise rather than a deliberate design strategy, where scalability translates to the design and construction of military infrastructure that can be rapidly adjusted during its lifecycle.

This chapter explores how the concepts of industrial, flexible, and demountable (IFD) construction and Legolisation, as derived from the civilian Building and Construction (BC) engineering practice, can address scalability challenges for large-scale (permanent) military infrastructures. Both concepts were adopted in response to the need of the civilian BC industry for change in the late 1990s. Therefore, the chapter starts with a discussion about the Living Building Concept (LBC) as published by de Ridder in 2005.³ The LBC concept was primarily intended as a new market model, that aimed to improve the interaction between clients and contractors/suppliers within the Dutch BC market. From a technological point of view, however, implementing LBC not only redefined how construction products are delivered to clients, but also established a framework that allows designers to materialise their concepts. Standardisation and modularisation form the core of this framework.

By employing the concepts of IFD construction and Legolisation, military engineers and construction teams can design and construct infrastructure and facilities that are rapidly deployable and redeployable. Moreover, these infrastructures will be adaptable to changing operational needs during their usage. In this chapter, two military case studies, Main Operating Base (MOB) Camp Bastion (UK) and MOB Camp Holland (NL), are analysed to evaluate the experiences with standardisation and modularisation during expeditionary missions and to identify relevant design (layout, both internal and external) principles applied by military engineers and construction teams in the past. Furthermore, this analysis not only shows that military engineers and construction teams already have ample experiences with applying these concepts, but it also suggests that design and construction in expeditionary missions bears resemblance to large-scale permanent construction.

It is important to note that containerisation has (some) resemblance with IFD construction. However, containers have fixed dimensions and limitations regarding their flexibility for functional adjustments, while IFD-based constructions offer more possibilities for multifunctional use. IFD-based constructions are designed with growth and change in mind, while containers can be less easily adjusted to changing operational (functional) needs. In addition, this chapter analyses NATO doctrines and supporting standards to assess their alignment with these concepts and design principles.

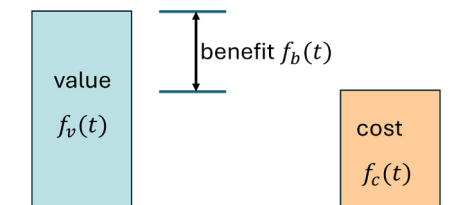
The application and integration of the concepts of IFD construction and Legalisation and design principles not only provide military engineers and construction teams with additional design and construction tools, but they also align with the broader sustainability and cost-efficiency objectives of the Dutch Defence organisation.⁴

Living building concept

In recent decades, the Dutch Building and Construction (BC) sector has faced persistent challenges, including fragmentation, inefficiencies, lengthy project durations, high costs, low profitability, excessive waste production, CO₂ emissions, poor working culture, limited innovation and transparency, and a lack of flexibility and adaptability in responding to increasing societal and political demands. Furthermore, the Commissie Bouwfraude revealed systematic collusive tendering practices in some BC subsectors in 2001.⁵

Well before the construction fraud scandals came to light, efforts to overhaul the sector were already underway. Initiated by the Commission Robers and later continued by PSIBouw and the Regieraad Bouw, these efforts have resulted in the development of new and innovative concepts aimed at improving the BC industry's performance.⁶ One such concept is the Living Building Concept (LBC), published by Hennes de Ridder in 2005.⁷ At the heart of the LBC lies the Value-Cost-Benefit (VCB) model, which aims to enhance the interaction between clients and contractors/suppliers by focusing on lifecycle value rather than merely on initial construction costs (Figure 6.1).

Figure 6.1 VCB model.⁸

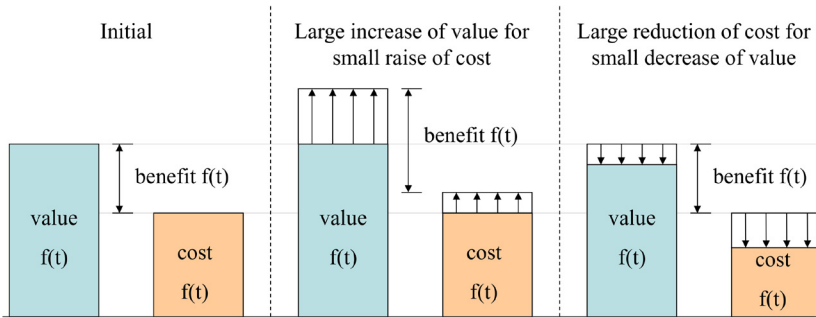


The most important implication of the VCB model is that during the BC project's acquisition stage the lowest price (cost) is not necessarily the clients' main selection criterion and driver. Instead, cost is to be related to the value to achieve the best possible lifecycle benefit. A strategy which is based on optimising benefits requires the implementation of relative new procurement or payment concepts such as a

Pay for Performance and Value-Based Purchasing.⁹ These concepts are incorporated into the contractual agreement between the client and contractor, often in the form of an integrated Design-Build-Maintain-Operate (DBMO) contract.

Instead of prescribing an absolute performance output against the lowest fixed price, these contracts define an agreed value-cost balance. Moreover, to maximise the benefit throughout the different phases of the project's lifecycle, the decision-making process should be based on a dynamic control strategy (Figure 6.2). This strategy shifts the emphasis from the static and one-time solutions, rooted in traditional BC project process approaches, to adaptable service and lifecycle-oriented solutions that dynamically respond to the client's changing demands or needs.

Figure 6.2: Dynamic control strategy.¹⁰



As a (first) proof of concept, LBC was applied in 2006 to the redevelopment of the Gemini Hospital in Den Helder, originally built in 1983. Although the project was ultimately not realised due to financial constraints and the hospital's later merging with Medical Centre Alkmaar in 2015, the LBC approach was thoroughly analysed during the project's early stage.

Fully aligned with the main principles of LBC, the entire project was tendered as one-single service, with collaborative parties forming bidding consortia. During the briefing phase, the client formulated the core requirements, in terms of expected performance rather than specific solutions. These core requirements were kept to a minimum, based on the available knowledge at the time of tendering. Several consortia were invited to develop an initial scenario and variations (i.e., change scenarios) on this scenario. The winning consortium would only be paid for a change scenario if it was implemented. The price of implementation was based on a pre-agreed unit price related to the value-cost ratio. The client establishes a starting budget, based on the initial scenario, and a risk budget for changes, ensuring that additional costs are only incurred when changes to the initial scenario are required.

During the project's execution, several benefits of the LBC approach were identified. The first benefit involved the development of different scenarios. Given the continuous changes in national and local government policies, shifts in healthcare financing, increased commercialisation of the healthcare sector in that period, and rapid technological advancements in medical care, the hospital's management decided to transform the facility into a flexible healthcare centre, offering multiple additional services. Considering these changes and the anticipated long execution time of the project, the necessity for developing different change scenarios became evident.

The second benefit of the LBC approach relates to the briefing and design processes. As noted, client requirements were captured in a minimum brief. The LBC consortium was invited to deliver an integrated solution, encompassing a new building, associated services and technology, as well as strategies to ensure flexibility. To achieve this flexibility, the primary solution (i.e., basic outline) was designed by physically disconnecting core hospital facilities from additional services, while still enabling these parts to be reintegrated if needed. The minimum brief together with early stakeholders involvement, increased the transparency and accelerated the briefing phase, while allowing for creative and innovative solutions to materialise in the design phase.

The third benefit relates to the lifecycle considerations of value and cost. With a dedicated risk budget to absorb the cost of changes, the client can focus on creating value throughout the contract. A lower overall price, compared to the traditional approach, was achieved because risks are not included in the price in the initial scenario. Moreover, high transaction costs for identifying and calculating such risks were also avoided, and there was no need to tender change scenarios. Additionally, by gaining in-depth knowledge of the facility's operational processes in an early stage, the consortium could lower costs for maintenance and facility modifications.¹¹

Industrial, Flexible and Demountable (IFD) construction and Legislation

According to de Ridder, LBC, from a technological perspective, incorporates several innovative and existing approaches, developed in response to the findings of the Commission Bouwfraude in 2002, to improve the BC industry's performance, among which is Industrial, Flexible and Demountable (IFD) construction.¹² In this chapter the definition provided by Damen Consultants (currently part of Bouwcentrum, the research division of PRC), as outlined in a report to the Ministry of Economic Affairs in 1997, is followed.¹³

In the afore-mentioned report, industrial construction is defined as all building production that takes place in a factory. Key characteristics of industrial

buildings include consumer-oriented production and marketing, project-independent production with flexible production systems and the use of interchangeable components. Second, flexibility refers to the characteristics of construction products that allows for adjustments to the needs of users. In the report, flexible construction is defined as the ability of a construction product to accommodate changes in user requirements. These adjustments fall into two categories: (1) variation in layout and material use tailored to different users of the facility and (2) the ability to modify the layout and applied construction components during usage to meet changing user needs. Last, demountable construction involves constructing a facility in a way that its components can later be removed as intact as possible, with minimal contamination and without damaging surrounding components or elements, and, if possible, be reused. Demountable construction not only applies to individual construction components, but also to spatial units as part of the layout planning of the facility.

An example of a demountable building component system is the CD-20 system, that uses prefabricated concrete elements for floors, facades, columns, and other structural components to create a load-bearing framework.¹⁴ Although this example shows the added value of the IFD concept, it also creates a situation where clients become dependent on a specific system provided by one single supplier, and thus dependent on the supplier's ability to scale up its production process.

To overcome some of the limitations of the IFD concept, de Ridder developed the concept of Legolisation as an extension to LBC in 2011. Inspired by the simplicity of LEGO blocks, de Ridder introduced modular construction, based on extreme standardisation and the plug and play principle. Although de Ridder does not rule out the standardisation of entire structures, he primarily anticipates the standardisation of (smaller) construction components and elements. He assumes that many facilities or structures will require generally similar components and elements, such as bricks, doors, windows, columns, beams, and floors.

To achieve such a modular approach, these individual 'building blocks' should be harmonised as much as possible in geometric, chemical, physical, mechanical, and structural terms, requiring extensive standardisation. This harmonisation then drives competition between suppliers to establish the dominant standard. Suppliers that succeed to develop a widely used standard for components or elements, gain a significant competitive advantage. For clients, the competition to establish a standard is also significant, as a standard emerges only when it offers an excellent value-cost ratio. Such a standard delivers the optimal solution and is essential for creating an efficient BC market. As a result, according to de Ridder, 'the construction market will begin to resemble the consumer goods market, where, for instance, it is common for different car brands to collaboratively develop a shared platform or engine'.¹⁵

Both concepts, IFD construction and Legolisation, were developed decades ago. Interest in the application of IFD, introduced in the early 1990s, peaked in the period from its introduction till the end of the 2000s. Ever since then the interest has declined. Legolisation, developed in 2011 as part of the LBC concept, was primarily aimed at reforming the BC market. Although the Legolisation concept was enthusiastically received by both clients and suppliers after its introduction, it still has yet to see widespread application, mainly due to the design (and to some extent production) challenges it entails.¹⁶ Most developments place primary focus on the creation of supporting digital tools such as Building Information Models (BIM) and 3D printing, as well as the integration with systems engineering approaches to support this concept.

However, recently, both concepts are experiencing a revival, influenced by the growing interest in circular construction. Circularity is one of the key aspects of sustainability, focusing on minimising waste and maximising material reuse.¹⁷ Modular construction minimises material waste through precision prefabrication of standardised components, while demountability of components ensures that elements can be rearranged and reused, extending their lifecycle.

Although IFD construction and Legolisation share fundamental principles, they differ in their main characteristics and technical implementations. The first difference concerns the discussion about demountable versus modular components. IFD construction focuses on demountable components, designed for easy disassembly and reassembly, which often requires dismantling components into individual elements on-site. In contrast, Legolisation focuses the design of self-contained construction products with standardised dimensions that do not need to be disassembled into individual parts.

A second difference involves the tension between standardisation and customisation. Legolisation relies on the use of identical (standardised) and mass-produced components to facilitate rapid construction with minimum design variation, whereas IFD construction offers more customisation and flexibility in shape, size, and function of its components, provided they adhere to demountable needs.

Finally, the two concepts differ in the level of permanence. Legolisation often produces semi-permanent or permanent structures, designed for rapid construction but intended to remain in place and function for longer durations. In contrast, IFD structures are designed for temporary or semi-permanent use, but their lifecycle – and even their location – can easily be extended and adjusted through periodic disassembly and reassembly. Table 6.1 summarises fundamentals of both concepts, highlighting their differences in technical implementation. Table 6.2 outlines the construction advantages of IFD and Legolisation compared to traditional construction.

Table 6.1: IFD construction versus Legolisation: fundamental properties comparing their technical implementation.

Technical implementation		
Fundamental	IFD construction	Legolisation
Modularity and standardisation	Prefabrication of element systems (supplier-dependent), universal (standardised) connections, complex on-site construction methods	Prefabrication of standardised components and elements (supplier-independent), simple integration and replacement, plug and play
Flexibility and demountability	Reconfiguration and renovation, multifunctional design, long-term adaptability without major reconstruction, specialised knowledge and equipment required	Reduction and expansion, fixed functional design, easy disassembly without damage, reusability of components, minimal specialised knowledge and equipment required
Adaptability and scalability	Designed for future reuse or adjustments, multiple lifecycles for the same structure, scalability depends on prefabrication capacity of individual suppliers	Suitable for rapid project changes, replacements without structural impact, modules easily expanded for larger structures or facilities, mass production of standardised components (different suppliers)
Sustainability	Circular design	Reduction of waste through reusable components, minimal environmental impact
Application, speed and cost	Prefabricated elements, for projects with tight time constraints and long-term use, long-term cost savings	Plug and play, temporary and semi-permanent structures, simple planning and construction process, lower initial costs

Table 6.2: Construction advantages of IFD construction and Legislation compared to traditional construction.¹⁸

Construction Aspect	Traditional construction	IFD construction/ Legislation
Construction time	Typically longer construction times due to on-site construction processes and delays from weather and site conditions, averaging 6–12 months for medium-sized projects	Generally shorter construction times due to prefabrication in controlled environments and standardisation
Cost	Initial construction costs may be lower. However, higher long-term construction costs are expected, due to inefficiencies, waste and longer timelines. Lifecycle costs are higher	Higher initial construction costs are reduced due to decreased waste, improved efficiency and shorter timelines. Lifecycle costs are lower due to their core fundamentals
Quality control	Higher error margins due to variations in on-site production and working conditions	Fewer on-site inefficiencies and variations, prefabrication in controlled environments leads to improved quality control, standardisation leads to higher consistency of construction products
Waste production	Typically generates more waste due to material surplus and on-site inefficiencies, limited reusability of materials	Produces less waste due to precise manufacturing and material usage
CO ₂ emissions	Higher CO ₂ emissions due to inefficiencies, longer construction times and multiple material deliveries	Lower CO ₂ emissions due to reduction of construction times, fewer deliveries and efficient material usage

Analysis of NATO standards

As noted, modularisation and standardisation are two key fundamentals of both IFD and Legolisation. However, these fundamentals are far from new for military engineers. Military engineers have long relied on standardised and modular construction methods to rapidly deploy, sustain and redeploy temporary and semi-permanent military infrastructure during expeditionary missions. However, the applied solutions, for example containerisation as discussed earlier, have their limitations with respect to (functional) flexibility and adaptability for permanent infrastructure during large-scale combat missions.

NATO doctrines and supporting standards serve as guidelines for military engineers for planning, deploying, sustaining and redeploying military infrastructure in diverse environments. An analysis of relevant NATO standards provides insight into how these standards already support or can be adjusted or expanded to integrate the core fundamentals of IFD construction and Legolisation. The key (and public accessible) NATO standards that intersect with these fundamentals are AJP-3.13 Allied Joint Doctrine for the Deployment and Redeployment of Forces, AJP-3.14 Allied Joint Doctrine for Force Protection, AJP-3.12 Allied Joint Doctrine for Military Engineering, ATP-3.12.1 Tactical Doctrine for Engineering and ATP-3.12.1.4 Deployed Force Infrastructure.

The first of these standards provides the overarching framework for deploying and redeploying military forces. According to this standard, 'deployment and redeployment operations depend on cooperation, coordination, effective planning and liaison to achieve the objective through most effective use of resources'. This emphasises the importance of flexibility, scalability and sustainability in military infrastructure, to support rapid deployment and redeployment. Other key elements to be considered include logistical planning, integration with host-nation facilities, environmental protection and adaptability to varying operational conditions.¹⁹

AJP-3.14 outlines the doctrine for the planning, execution, and assessment of Force Protection across the full spectrum of Alliance activity. The purpose is to describe the fundamental aspects of Force Protection, providing guidance to commanders and their staff on the planning and implementation of Force Protection. Although the standard is primarily focused on the Joint Operational level, its principles can be readily applied to any level of operation.²⁰

AJP-3.12 describes the military engineering (MILENG) function and its application in the planning and conduct of joint operations. The doctrine focuses on the synchronisation and coordination of MILENG capabilities, activities, and resources during the preparation, execution and termination of an operation.²¹

Lastly, ATP-3.12.1 describes the roles and activities within the engineering field of expertise and the context in which they occur. Although primarily intended for NATO commanders and their staff at the tactical level, it also provides guidance relevant to all levels of command,²² while ATP-3.12.1.4 outlines recommended scales, standards and procedures for providing accommodation and essential services to expeditionary forces, referred to as Deployed Forces Infrastructure (DFI). Its goal is to establish a shared understanding of the minimum military requirements necessary to design an infrastructure for military purposes.²³

In accordance with these NATO-guidelines, DFI is based on the estimated duration of an operation, ranging from a timescale from several weeks (Tier 1) to a permanent standard (Tier 4). This classification is used to determine the level of essential services for expeditionary missions.

In expeditionary scenarios, Tier 2 DFI is central due to operations requiring rapid deployment and the ability of essential facilities to be built by military personnel and/or civilian contractors, often supported by locally employed civilians. In addition, long-term costs are a key factor, making multiple or flexible building use a critical consideration for infrastructure design. Last, the infrastructure is a military resource that requires careful accounting and management, just like any other operational asset. Therefore, long-term costs must be considered, by making multiple or flexible building usage possible.

Based on recent operational experience and practice – incorporated into the latest NATO doctrinal revision cycle modularity – a modular system of DFI is recommended where every module can accommodate a 125-person company group with a minimal level of functional capability. When employing this approach to modularity, three types of objects can be identified: standardised, modular, and tailor-made. The standardised objects do not need to change to reflect local conditions and can be employed regardless of the deployed environment. Modular objects consist of standardised modules that can be combined, added, or removed as needed. Tailor-made objects must be adapted for each deployment, due to their sensitivity to external factors such as soil conditions, climate, and local resources. Figure 6.3 shows the modularity decision tree. Table 6.3 shows results of the analysis of the technical implementations set by NATO standards and the impact on the construction aspects of DFI (compared with traditional construction).

Figure 6.3. The modularity decision tree.²⁴

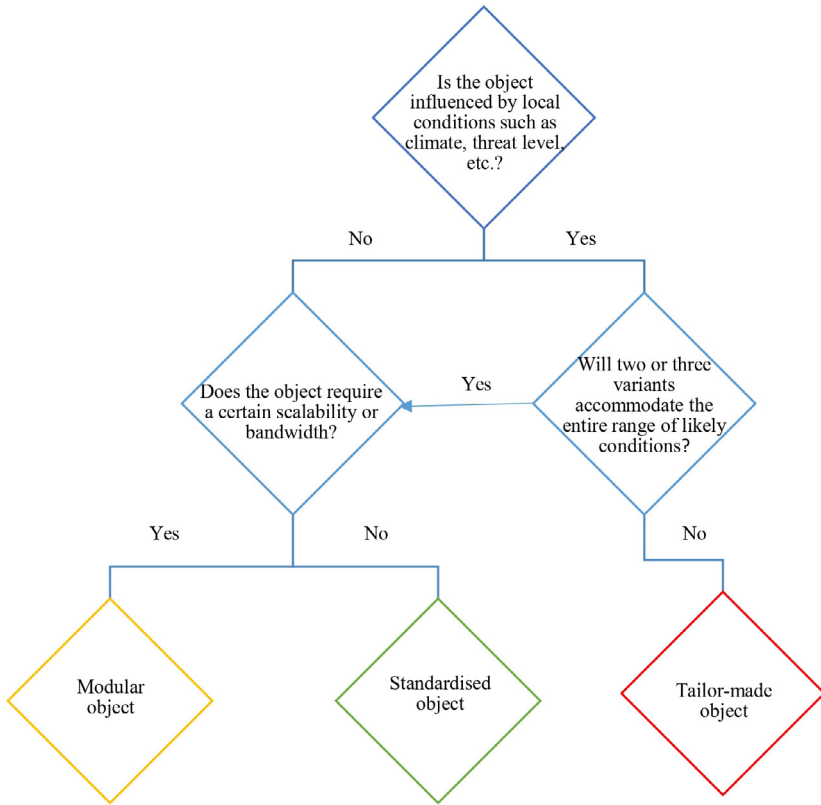


Table 6.3. Fundamentals, technical implementation and construction aspects of DFI.

NATO standards	
Fundamental	Technical implementations
Modularity and standardisation	Standardisation is preferred, modularity is needed to scale up the capacity of the infrastructure
Flexibility and demountability	Reconfiguration and expansion, multifunctional design, long-term adaptability without major reconstruction, minimal specialised knowledge and equipment required
Adaptability and scalability	Designed for future reuse or adjustments, multiple lifecycles for the same structure, scalability needed in initial lifecycle
Sustainability	Reusability of components, minimal logistical movements to support the infrastructure during operation and maintenance
Application, speed and cost	Depending on the Tier-level, but mainly focused on plug and play, temporary and semi-permanent structures, simple planning and construction process, lower initial costs
Aspect	Deployed Force Infrastructure
Construction time	Short construction times, averaging 1–12 weeks with military personnel
Cost	Medium costs due to the limited timespan, with relatively light materials bought
Quality control	Possibly a low error-percentage, but a higher percentage of failure, due to the building environment and the experience of the military engineers or civilian employed contractors
Waste production	In the planning guidance, the infrastructure is designed to be handed over to perform a different function. This minimises the waste in the function as DFI planning must consider sustainability
CO ₂ emissions	Higher CO ₂ emissions due to longer transportation to deployed area

Analyses of expeditionary military facilities: MOB Camp Bastion and MOB Camp Holland

After conducting an initial analysis of relevant NATO standards, it is worthwhile to examine cases where these standards have been partially implemented by military engineers in practice. By analysing these cases, an assessment can be made on how these standards have shaped design approaches and identify the key lessons learned. Two cases will be examined: (1) MOB Camp Bastion and (2) MOB Camp Holland, that provide insights that may be helpful in addressing contemporary challenges.

MOB Camp Bastion

During the International Security Assistance Force (ISAF) operations (2001–2014), Camp Bastion in Helmand Province, Afghanistan, served as a Main Operating Base (MOB). Initially designed as a logistics base with minimal facilities, it rapidly expanded to meet growing operational demands, ultimately becoming the largest UK base since the Second World War. At its peak between 2011 and 2012, Bastion accommodated up to 14,000 personnel and featured a fully operational airfield, high-end medical facilities and extensive logistical infrastructure. The Masterplan for Camp Bastion, designed as a living document, incorporated the core fundamentals of IFD construction and Legolisation – either directly or indirectly – to address evolving operational needs from the outset. These design principles and strategies included step-by-step expansion, zoning, spatial organisation, layering and standard design.

Initially built as a small base with tents, Camp Bastion expanded incrementally (step-by-step). Key facilities such as modular Temporary Deployed Accommodations (TDAs), an extended runway, helicopter maintenance hangars, and a water bottling plant were added in phases to match growing demands.

To support step-by-step expansion, the Masterplan employed a zoning model, like the design approach that was used for the Gemini Hospital in Den Helder, as discussed earlier. The base was divided into several functional zones, including a logistics zone (containing supply storage and vehicle maintenance areas), a medical zone (for housing medical facilities), a residential zone (for housing military personnel) and an operations zone (for command and communication centres). This allowed zones to be expanded without disrupting the others. The zoning approach was also applied to underground infrastructures, such as water supply and waste disposal systems. For example, waste disposal initially relied on temporary solutions, such as portable units or septic tanks. As the base grew, more permanent sewage systems were installed in each separate zone, allowing expansion within its designated zone independently.

In addition to the zoning approach, the application of spatial organisation ensured efficient movement of military personnel and equipment, with internal roads connecting functional zones. Furthermore, high-risk areas, such as ammunition storage areas (in the logistics zone), were isolated from the residential zone to mitigate risks.

The functional zones were protected with several security and safety measures, whose materialisation depended on the associated function. This layered approach controlled access to critical infrastructure and enhanced the protection against threats from the outside.

Standardised base facilities, as listed in the Theatre Construction Management System (TCMS), were used when possible, to increase the speed of design and construction processes and to comply with applicable international building codes. TCMS was developed to support base design via two US Technical Manuals: (1) Army Facilities Components System – Designs (5-301) and (2) Army Facilities Components System – Logistics Data and Bills of Materiel (5-303). These manuals provide blueprints for design projects, including military bases. These blueprints, offer military engineers ready-made examples of design projects thus eliminating the need for engineers to design a military base from scratch.²⁵

The use of standardised designs (as listed in TCMS) and modular components, such as TDAs, highlights the importance of modularity and standardisation and to some extent demountability. The step-by-step development approach highlights the essence of flexibility, that allowed the initial base to grow and adapt to changing requirements incrementally. The zoning and layering strategy, together with spatial organisation, highlights the importance of adaptability and scalability. In addition, it is expected that the use of standardised and modular designs led to shorter construction times and lower costs. However, this remains an assumption, because no specific data or studies are available to confirm this, at the time of writing.

MOB Camp Holland

Camp Holland, located south of Tarin Kowt in Afghanistan's Uruzgan province, served as a Main Operating Base (MOB) for Dutch and allied forces from 2006 to 2010. Like Camp Bastion, Camp Holland was designed for logistics operations of the Dutch-led Provincial Reconstruction Team (PRT) and for the Battlegroup Task Force Uruzgan, tasked to stabilise the province by providing infrastructure support and security.

Camp Holland was constructed on a location of a former Forward Operating Base (FOB), initially constructed by the US. Under the responsibility of the 1st Logistics Brigade of the Royal Netherlands Army, it took five months between

March and July 2006 to complete initial facilities required by the Dutch forces. Camp Holland faced similar challenges during its operation as observed in Camp Bastion. Although the base was originally designed to host around 1000 Dutch personnel, operational demands grew over time. At its peak between 2009 and 2010, the base accommodated as many as 2400 personnel, including 400 personnel from Australia. The base included an operational airfield (paved dirt strip), medical facilities (Uruzgan Medical Centre, UMC) and a logistical infrastructure.

Although Camp Holland incorporated some of the core design principles and strategies outlined in the Camp Bastion Masterplan (i.e. zoning, layering and spatial design), no specific masterplan was drafted to meet potential changing operational needs. Instead, adaptation to meet the base's need had to be determined on-site, guided by the expertise and creativity of military engineers. The use of numerous standardised armoured containers to accommodate the various functions on the base provided a degree of the necessary modularity and flexibility. Figure 6.4 shows an example of the use of armoured containers for housing personnel.

Figure 6.4: An example of armoured containers.²⁶



Another example of modularity was the use of Hesco for protection against explosions or small-calibre arms weapons. In its most basic configuration, an FOB consists of barbed wire surrounding a position with a reinforced Entry Control

Point (ECP). More advanced FOBs include concrete barriers, gates, guard towers and other infrastructure and security measures to protect critical zones and equipment. These additional Force Protection measures or security enhancements are often constructed using Hesco bastions. A Hesco module is made of a wire mesh container with a heavy fabric lining filled with sand or rocks. Figure 6.5 shows an example of Hesco bastions at Camp Holland.

Figure 6.5: An example of a Hesco bastion in Camp Holland.²⁷



Both cases and highlighted examples demonstrate two of the core fundamentals of IFD construction and Legalisation: modularity and standardisation, while addressing two other core fundamentals: flexibility and adaptability. The zoning model, layering and spatial design supported scalability and the use of lightweight construction elements on-site ensured demountability. Applying these core fundamentals to the design and construction process enabled the Dutch military engineers to swiftly construct an initial camp during the deployment phase and respond quickly to changing operational needs, whether it involved accommodating more personnel, building new support facilities, or adapting to changing security conditions, during the operational phase. Equally, it also allowed for rapid disassembly during the redeployment phase.

However, regarding the core fundamental of sustainability, a public debate arose about the handling of (construction) waste at Camp Holland. Until 2008, open burn pits had been used, at the east side of Camp Holland, which posed considerable

health risks for (military) personnel.²⁸ After 2008, incinerators were installed, but these proved to be only partially effective. According to the Dutch Ministry of Defence, implementing proper environmental care remained challenging due to operational, logistical, and in the case of the incinerators, technical constraints.²⁹

Another challenge concerned the costs of redeploying military assets, including armoured containers and equipment after the mission. The original plan of the Dutch MoD directorate of Operations (Directie Operaties, DOPS) was to transport all military assets back to the Netherlands via road, sea, and air, depending on its type and condition. However, after four years of intensive use in extreme climate conditions, many of these assets had little residual value and/or expected lifespan and thus no longer justified the high transport costs. While a portion of the military assets was indeed returned to the Netherlands, a significant amount, including the armoured containers, was not. Instead, these assets were transferred to Combined Team Uruzgan (CTU), comprising American and Australian forces.

Conclusions and discussion

The shift from expeditionary missions to large-scale combat operations, characterised by fast changing operational environments, increases the need for more scalable and adaptable large-scale military infrastructures. The application of the concepts IFD construction and Legolisation, as derived from the civilian Building and Construction (BC) engineering practice, offers significant advantages compared to both traditional (civilian) large-scale and military expeditionary construction. The key findings from this chapter are:

- *Scalability and adaptability*: Although military expeditionary construction already employs modular components, such as containers, the modularisation principles of IFD and Legolisation provide more flexibility for functional adjustments for large-scale permanent constructions during long-term combat operations. In addition, they offer the same advantages for rapid deployment and redeployment before and after military operations. This ensures that military infrastructures remain functional during their entire lifecycle, independent from changing needs and operational combat environments;
- *Lifecycle optimisation, cost efficiency and sustainability*: The adoption of the principles of LBC ensures that military infrastructure investments are optimised, in terms of value and cost over their entire lifecycle, while reducing overall waste production and CO₂ emissions;
- *Standardisation for dual-use applications*: A successful implementation of both concepts, IFD construction and Legolisation, for large-scale construction, requires market standardisation of construction components and elements.

The defence sector can act as an important driver in establishing these market standards, that enable the integration of modular construction techniques in both military and civilian (dual-use) settings;

- *Practical applications:* The case studies of Camp Bastion and Camp Holland highlighted that some of the fundamental principles of scalability and adaptability in IFD and Legolisation have already been successfully applied during expeditionary missions. The Camp Bastion Masterplan introduced phased expansion, functional zoning, and standardised designs, as means to provide scalability and flexibility in its overall layout. The Masterplan was developed according to a lifecycle approach, as defined in LBC, by taking various scenarios into account for future expansion. The modular approach allowed Camp Bastion's infrastructure to be adjusted as operational requirements evolved. Camp Holland highlighted the use of containers and Hesco bastions for protection and flexibility. In addition, both cases highlighted that military infrastructure has been aligned with the military lifecycle, but not with the true lifecycle (including post-operational use), in line with LBC.

The implementation of the concepts IFD construction and Legolisation in military design and construction processes requires not only technical innovation but also a paradigm shift in how the defence organisation approaches infrastructure planning. In this regard, the key discussion points are:

- *Strategic implications:* The use of modular construction techniques means that military infrastructures no longer need to be permanent, thus offering strategic advantages in terms of mobility and camouflage, depending on the scale of execution. However, this raises the question of whether modular infrastructure can be made sufficiently robust for long-term use in combat environments. Modular infrastructures in these hostile environments need to be resilient against explosions, ballistic threats, drones and cyber-attacks. This requires product innovations and continuous collaboration with the defence industry and research institutes;
- *Logistical and training challenges:* Although IFD construction and Legolisation simplify transport and (re)deployment, their implementation requires a revision of the logistical chains within defence organisations. The storage and distribution of modular components and elements must be integrated into existing supply lines. This requires specialised training programmes for military engineers and construction teams;
- *Interoperability and standardisation:* Most military large-scale operations are multinational operations. Therefore, NATO partners and other allies need to agree with the specifications of standardised construction components and elements. It is expected that a successful implementation of IFD construction and

Legislation requires a new set of military building regulations and standards. This would lead to broader adoption of these concepts and enhance the supply chain reliability within the BC industry.

Notes

- ¹ Netherlands Ministry of Defence, *Defence Vision 2035*.
- ² This book.
- ³ Ridder, de, *LEGOLisering van de bouw – industrieel maatwerk in een snel veranderende wereld*.
- ⁴ Netherlands Ministry of Defence, *Uitvoeringsagenda Duurzaamheid Defensie*.
- ⁵ Staten-Generaal, *Bouwfraude en corruptie bij ambtenaren; Rapport van de tijdelijke commissie onderzoek bouwfraude*.
- ⁶ Robers, *Process and system innovation in the Dutch construction industry*.
- ⁷ Ridder, de, *Living building concept – Een wenkend perspectief voor de bouw*.
- ⁸ Ridder, de, *Living Building concept – Een wenkend perspectief voor de bouw*, 48 (interpretation).
- ⁹ Beeres, R.J.M. et al., *The strategic value of life-cycle costing*.
- ¹⁰ Ridder, de, *Living Building concept – Een wenkend perspectief voor de bouw*, 135 (interpretation).
- ¹¹ Ridder, de and Vrijhoef, *Living building concept applied to healthcare facilities*.
- ¹² Ridder, de, *LEGOLisering van de bouw – industrieel maatwerk in een snel veranderende wereld*, 9.
- ¹³ Herman, *De marktpotentie van IFD-bouwen voor de Nederlandse bouwindustrie: beleidsrapportage*.
- ¹⁴ <https://www.cdzo.nl/>
- ¹⁵ Ridder, de, *LEGOLisering van de bouw – industrieel maatwerk in een snel veranderende wereld*, 127.
- ¹⁶ Witkamp, *Circular area development: Benefit and bottleneck mapping for implementing circularity in residential area development*.
- ¹⁷ Corona et al., *Towards sustainable development through circular economy*.
- ¹⁸ <https://www.bouwvotaal.nl/2023/11/de-voordelen-van-modulair-bouwen-in-vergelijking-met-traditionele-bouwmethoden/>; <https://www.converge.io/blog/modular-vs-traditional-construction/>; <https://enlightio.uk/news/modular-vs-traditional-construction/>; <https://pasbv.nl/modulaire-bouwa-methoden/>; Subramanya et al., *Modular construction vs. traditional construction*; Kouhirostami and Chini, *Comparison of carbon emissions of modular and site-built residential construction*.
- ¹⁹ NATO, Allied Joint Publication (AJP)-3.13(A), *Allied Joint Doctrine for the Deployment and Redeployment of Forces*.
- ²⁰ NATO, Allied Joint Publication (AJP)-3.14, *Allied Joint Doctrine for Force Protection*.
- ²¹ NATO, Allied Joint Publication (AJP)-3.12 (N), *Allied Joint Doctrine for Military Engineering*.
- ²² NATO, Allied Tactical Doctrine (ATP)-3.12.1, *Tactical Doctrine for Engineering*.
- ²³ NATO, Allied Tactical Doctrine (ATP)-3.12.1.4, *Deployed Force Infrastructure*.
- ²⁴ NATO, Allied Tactical Doctrine (ATP)-3.12.1.4, *Deployed Force Infrastructure*, 3–4 (interpretation).
- ²⁵ US Military Planning Group, *Camp Bastion, Leatherneck, Tombstone Base Camp Master Plan*.
- ²⁶ Private collection ME groep, Faculty of Military Sciences.
- ²⁷ Private collection ME groep, Faculty of Military Sciences.
- ²⁸ <https://burnpit.nl/meldpunt-burnpits-kowt-tk-afghanistan/>.
- ²⁹ Netherlands Ministry of Defence, *Rapportage werkbezoek Sectie Milieu aan TFU – milieureview en opbouw afvalverbrandingsovens*.

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The challenge of scaling innovation in the Netherlands armed forces: Integrating technological artifacts in multilayered sociotechnical systems

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Abstract

This chapter examines the challenges of scaling sociotechnological innovations in large, multi-layered organisations. Using a sociotechnical lens, it highlights how organisational structures shape the integration and scaling of technological innovations. A framework of four types of sociotechnical innovation is identified, describing different associated challenges. This framework is then used to focus on a project in the Netherlands armed forces on Robotics and Autonomous Systems (RAS), focusing on the innovation process around the THeMis robot. A key challenge that we identify is that technological affordances are ambiguous when the scale and scope of the innovation process is unclear.

Keywords: Sociotechnical systems; Innovation; Sensemaking; Imaginaries, Robotisation

Introduction

Particularly since the Russian invasion of Ukraine in 2022, there has been a growing awareness in Western countries of the precarious nature of the international security situation. The notion of all-out war has returned to the fore as well as the need to transform and develop European armies. Similarly, the ongoing conflict has signalled the importance of emerging innovations such as drone warfare. Such innovations may be driven by new technologies, but they are essentially sociotechnical in nature as they have transformative impact on the activities of individual soldiers, but also on the process of designing units and larger formations.¹ In this strategic environment, the challenge of scaling innovations and ideas into military performance is an integral issue that links technology, human activity and organisational frameworks. Given the volatility and unpredictability of its strategic environment, the Ministry of Defence in the Netherlands has denominated scalability as one of its main challenges to remain effective. The Defence Vision 2035²

– published in 2020 – sets out the capabilities that the military organisation should develop. According to this vision, it should develop into a smart, technologically advanced organisation with a high ability to adapt to different situations and able to make use of the best information. The military organisation of the future should be highly innovative, flexible, rapidly deployable and able to act autonomously.³ Central to this drive for innovation is a particular challenge of developing new ideas to an operational scale.

In innovation studies, the challenge of scaling ideas to viable solutions is related to what is called “diffusion”. Influenced by the work of Rogers, the issue of diffusion is seen as a core challenge in the field.⁴ Rogers defines diffusion as the planned and unplanned spread of new ideas. Several elements influence this process of diffusion, one of which is the character of the social system in which diffusion takes place.⁵ The structure of a social system affects diffusion; more specifically the process of diffusion is affected by the formal patterning of social relationships and the informal, interpersonal networks potential adopters are part of.⁶ In large formal organisations, diffusion refers to the challenge of scaling innovation – specifically, the transition from a prototype to viable solutions that form an integral part of the organisation’s operational core.⁷ Integrating innovations into existing work processes by individuals is closely linked to managerial and strategic challenges within the military organisation.⁸ This interaction between innovation, human choices and organisational structures is referred to here as a sociotechnical dynamic.⁹ Scaling innovation in this sense is a more complex challenge than just disseminating new ideas, as it involves developing them and then integrating them into the practices of a large and multilayered organisational system. While this is one aspect of the broader notion of scalability, which may include developing greater industrial production capacity or setting up public-private partnerships,¹⁰ it is a core challenge for a military organisation that has innovation at the top of its agenda.

In this chapter, we proceed from the premise that scaling innovations from prototype to viable solutions is quite the challenge in large and complex bureaucratic public organisations. The complexity of technological transitions arises from the ongoing interplay between strategic considerations and the practical application of technology. This process begins with a strategic vision and deliberate choices, often shaped by external influences.¹¹ Once an innovation is implemented, it establishes a link between high-level strategic decisions and the realities of local practices.¹² In what follows, we start by developing a theoretical position that characterises the main challenges in sociotechnical innovation. We then describe an analytical framework that identifies four qualitatively distinct types of sociotechnical innovation, with different specific challenges associated with them. In a next step, we apply this framework to a case, which is used to illustrate the main challenges in moving from “prototype to viable solution”. The specific case we discuss is an

innovation project in the Netherlands armed forces in the field of Robotics and Autonomous Systems (The RAS project). This project has been running within the Ministry of Defence since 2019. We have selected this case because it is ‘critical’ in the sense that we expect it to illustrate processes that might be at play in different parts of the military organisation as well as in other larger established bureaucratic public organisations.¹³

The relationship between technological artifacts, human activity and organising

Karl Weick proposed the phrase ‘technology as equivoque’ to characterise the challenge that new technology poses to organisations.¹⁴ In the most literal sense, Weick wanted to emphasise that technology potentially has multiple voices:

An equivoque is something that admits of several possible or plausible interpretations and therefore can be esoteric, subject to misunderstanding, uncertain, complex and recondite. (...) Because new technologies are equivocal, they require ongoing structuring and sense-making if they are to be managed.¹⁵

This is a process that is also linked to imagination.¹⁶ Weick’s point is that technological innovation in organisations is far from a straightforward and linear process, which contrasts with deterministic perspectives, according to which the effects of new technologies can be deduced straightforwardly from their functional specifications.¹⁷

In deterministic views, technology leads human behaviour and organisations in a fixed direction. Integrating new technology in organisations is perceived as a straightforward process. For example, the design of a conveyor belt might be seen as the inevitable consequence of mechanisation technology. This perspective ignores the role of human agency and social context in shaping technology’s impact. While technological determinism is widely disregarded, its opposite extreme of social voluntarism is criticised as well. Such positions treat human agency as absolute and largely dismiss the influence of technology’s material properties.¹⁸ In the context of organisational change, voluntarist positions assume that the nature of specific technological artifacts is largely irrelevant, relying instead on well-developed organisational design principles that abstract from technological contexts. Orlikowski critiques such social constructionist views for underestimating the material and structural properties of technology in shaping human interactions.¹⁹ Most organisational researchers therefore seek positions that are ‘neither too deterministic, nor unduly voluntaristic.’²⁰

Sociotechnical theory emerged as a response to the deterministic stance of scientific management theory in the early 20th century.²¹ Its core principle of organisational choice posits that organisations are not passively shaped by external forces (determinism) but possess discretionary flexibility to respond in ways they consider desirable.²² Organisations can influence the way in which they integrate new technology, but this ‘choice’ is not ‘unlimited’ (voluntaristic). As such, it navigates a middle path between technological determinism and voluntarism, emphasising the interplay between technology, human activity, and institutional properties. Sociotechnical theory highlights the continuous and dynamic interaction between technology, human agency, and social context, and offers a more balanced and integrative framework for analysing the role of innovation in organisations. New technologies trigger a sensemaking process, focusing on what technology is and what it might mean.²³ In this view new technology affords new possibilities for action,²⁴ which subsequently rub against the structural frameworks in which they usually take place. Technology thus introduces new possibilities for human activity in structured environments, triggering a continuous and dynamic process of sensemaking.²⁵ As such, it is not just a tool, but an artifact that acquires both social and technical significance through its use within organisational frameworks. Weick therefore advises researchers to look for ‘(...) an ongoing redefinition among structure, action and technology’.²⁶

Sociotechnical systems as multilevel interaction networks

A central element of the sociotechnical perspective is that the organisational complexity of sociotechnical systems is strongly influenced by the way in which they are layered (or ‘structured’). A layered sociotechnical system consists of subsystems within systems as a consequence of a broader division of labour. A structural skeleton integrates different parts of a sociotechnical system and can be thought of as a bare bones framework around which an organic tissue of system of human interaction develops.²⁷ The result is a social interaction network across the micro level (task performance), mid level (task grouping), and macro levels (strategy and structure) of sociotechnical systems. Such a multilayered structure makes integrating technology into a larger organisation more complex.²⁸ Moreover, technology alone does not transform the organisation, but acts as a tool used by individual action within the organisational structure to improve and optimise its core processes.²⁹ Prior research on technological innovation in public organisations has identified numerous managerial and strategic challenges (or uncertainties) when integrating such innovations into multilevel structures.³⁰ Firstly, implementing technology often leads to strategic power struggles between different organisational units and levels. As work processes

evolve through the use of technology, other stakeholders – such as financial departments or project managers – may gain more control over the core processes. This can result in shifting power dynamics, including conflicts over resources, ownership of tasks, and potential changes to existing hierarchical relationships.³¹ Secondly, the actual use of technology by employees on the ground (discovering new affordances) requires constant coordination of revised internal tasks and the alignment of interests emerging from these changes with the existing priorities of both internal (accountability within the structural framework) and external stakeholders (interactions in stakeholder networks).³² These challenges become even more pronounced when innovation requires significant structural redesign.

This dual uncertainty is why literature on innovation management often emphasises the importance of experimentation and prototyping to uncover affordances and subsequently integrate them into structural frameworks. In essence, this is a process of sensemaking combined with one of designing. To better understand the relationship between technological innovation and organisational (structural) design, Kramer and Van Os³³ identify four distinct types of sociotechnical innovation. These types represent different ways new technology potentially may challenge structural frameworks. Their model adapts Henderson and Clark's³⁴ typology of technological innovations, translating it to sociotechnical systems. The categories as shown in Table 7.1 can be applied at different levels of analysis, depending on the definition of system boundaries.

Table 7.1: Sociotechnical innovation on a systems level³⁵

	Type of sociotechnical innovation	System level (example)	Type of transformation
1	<i>Incremental</i>	Individual	Task design
2	<i>Modular</i>	Group	Design of work process
3	<i>Architectural</i>	Organisation	Organisation design
4	<i>Radical</i>	Organisation, ecosystem	Strategic reorientation

Incremental sociotechnical innovation involves changes with minimal spillover effects on the wider system under study. It may affect individual activities and lead to adjustments in task design, but its impact on the wider system is negligible. As Barley noted, the influence of technology crosses a critical boundary when it affects with whom and how people interact because technology then begins to influence roles and relationships (i.e. human activity and structural frameworks).³⁶ Modular sociotechnical innovation takes place within the boundaries of a subsystem. For example, the introduction of new technology may require the redesign of internal

cooperative relationships within a specific team. Architectural sociotechnical innovation entails a system-wide transformation affecting a cluster of subsystems. This type of innovation requires a reconfiguration of the structural design of the integral system under consideration. Radical sociotechnical innovation redefines the relationship between the system and its external environment. It focuses on far-reaching strategic shifts and the development of new types of relationships with the ecosystem of external stakeholders in which the organisation operates.

Scaling innovation as a multilayered challenge

In this chapter, the issue of scaling refers to the challenge of progressing ‘from prototype to viable solution’ and involves the diffusion of new ideas across levels. The issue of scaling remains relatively straightforward when sociotechnical innovation remains confined at the incremental or modular levels. A new tool for an infantry platoon does not necessarily require new strategic concepts for land operations. Conversely, radical innovations might require transformation at all levels. Seen in this light, incremental and modular innovations are relatively straightforward because they remain constrained by a structural boundary that pre-defines the (role of the) artifact to a considerable extent. In such cases, technology may potentially be disruptive, but in fact, existing structures constrain meaning and possibilities. Innovation remains stuck in a mode of ‘bolting new technology onto an old organisation.’ In more complex processes of sociotechnical innovation, the interaction between artifacts, human activity and structural frameworks is at stake in more profound ways. For example, changes at the lower levels *might* trigger changes at the architectural and radical levels, but the specific ways in which this happens remain unclear because affordances of equivocal artifacts are unclear at the onset. As a result, such innovation processes lack a firm ‘rock bottom’ to reduce the equivocality of artifacts. While potentially this is an approach to develop transformative change, the innovation processes itself may become (frustratingly) complex because of the complex interaction of artifacts, structural frameworks, relevant stakeholder networks, and human activity.

Description of the RAS case

Building on the sociotechnical perspective discussed above, the analysis of the RAS case proceeds in two stages. The first stage involves reconstructing the sensemaking process around the THeMis robot, answering the question: ‘What is the nature of the artifact?’ While this may seem straightforward and the most obvious question one

may ask, the case illustrates how clear answers are ultimately hard to obtain. In the second stage, the focus shifts to goals of the RAS project in relation to the organisational structure, asking: ‘What is the focus of the transformation?’ The data used in this chapter comes from an exploratory study on a technological innovation within the Netherlands armed forces. The study focuses on a project aiming to experiment with scenarios in which an unmanned ground vehicle (UGV) is integrated into infantry operations. This UGV experiment is part of the Robotics and Autonomous Systems (RAS) program. The aim of the case study was to identify, describe and explain organisational issues surrounding the RAS project. The study examines whether and how technology alters work processes and identifies organisational challenges. The experiences of stakeholders directly involved in this project were used as an empirical basis. The interviewees are positioned in the multilayered social interaction network surrounding the RAS project and play a central role in addressing the various organisational issues that arise. Here we use the results of our exploratory study to illustrate the challenges of sociotechnical innovation discussed above.

A single-case study (deployment of a UGV in one platoon) was chosen because it allows for in-depth, long-term observation within the specific defence context. The approach to analyse the social interaction network was inspired by a methodological guideline from Latour. He advises researchers to use the principle of ‘follow the connections’.³⁷ That is, researchers should try to build a picture of the network of actors involved by following how different actors are connected to each other and how their actions are influenced by this network. A distinctive feature of this strategy is that the researcher does not start by delineating an existing system (an observable and existing organisational entity) as this would limit the analysis to system boundaries drawn by an organisation itself. This would limit the ability to trace developments that rub against defined system boundaries. Furthermore, a social interaction network evolves over time, including during the case study. The technological artifact we studied is therefore situated in a system that does not correspond one-to-one with the organisational structure as it appears on paper. Inevitably the strategy of ‘follow the connections’ is selective. That is, in principle, the number of connections to follow is quasi-inexhaustible. Following a particular connection involves a choice. This choice – apart from the real limitations of the time available – is based on the theoretical framework presented in the previous chapter. It is the sociotechnical lens that provides a compass for deciding which connections to follow. In terms of the ‘follow the connections’ strategy, the starting point was the experience of those most directly involved with the artifact, zooming out towards a wider complex sociotechnical system that is directly or indirectly involved.

Data was collected through interviews and document analysis (e.g., strategy notes and policy plans). Fifteen interviews were conducted with key respondents – people of different ranks who are closely involved in the project. Specifically,

we interviewed three members of the RAS-cel in Oirschot, three infantry platoon commanders, two members of the Brigade staff in Oirschot, one member of the Infantry Battalion Staff, three members of the Army's innovation staff branch called Concept Development and Experimentation (CD&E), one member of the Army central staff, one member of the armed forces central innovation staff in The Hague (FRONT), and one representative of the manufacturer (Milrem). The same interview protocol was used for each interview, and the transcripts were coded in two rounds (open and axial) by two independent researchers. The intention was not to develop a historical account or an evaluation of the project. The interviews cover the period up to 2022, after which the RAS-project evolved further. However, as the case analysis will show, it was possible to identify key dynamics based on data from this period. As the results of the case illustrate essential dynamics proposed by our analytical framework, we postulate that they are relevant more broadly, both in the further developments of the RAS-project and in other projects of technological innovation in the military organisation.

Making sense of the artifact

This section focuses on the process of making sense of the artifact. Essentially this is about discovering affordances. How have interviewees identified the artifact and what do they believe it enables? The interviews suggest several very different ways in which the artifact could be defined, with significant consequences for the definition of the RAS-project. Our aim here is not to fully describe the different possible definitions of the artifact, nor to describe every twist and turn of the project. Instead, several different definitions are discussed to indicate how controversial the identity of the artifact really is.

Initial testing with the THeMis focused on the robot's role as a 'donkey' that could carry luggage or as a platform that could be used to transport wounded soldiers. Another definition of the robot was as a potential 'sniffer dog', equipped with sensors that allow it to sniff out an area for nuclear radiation or gas. In the role of 'watchdog', the robot scouts the gates of a military compound. This is a role that is not necessarily tied to the infantry. It can be carried out with cameras ('eyes'), or with advanced sensors (with artificial intelligence functionality) that can signal certain threats. In yet another role, only briefly mentioned to us, a (autonomous not remotely controlled!) robot was imagined providing logistic support to outposts in a mission area, with a robot playing a supporting role. Perhaps the most controversial development was to equip the robot with a weapons system. Attaching a weapons system to a robot means changing its identity from a tool with a supporting role to an asset that plays a key role in infantry operations. It is also potentially possible to

equip the robot with many different types of sensors, such as those for tracking and wiretapping mobile phones. Robots equipped with advanced sensors can be used to collect data and potentially different robots may be connected in a network. Another issue in the definition of the artifact is whether it is considered as a physical artifact, or an integrated hardware and software system that produces data about its operational deployment. The answer to this question may even shape the relationship between armies and manufacturers. The choice for the THeMis robot developed by Milrem, rather than a robot produced by a more established manufacturer (such as Rheinmetall), is related to this question. Interviewees from both the Brigade staff and CD&E pointed out that this choice was strategic in the sense that Milrem allowed software to be developed by users, making the Army less dependent. When an established manufacturer offers an integrated hardware and software package, the question arises, for example, of who owns the data produced by the vehicles.

There is clearly a substantial difference between ‘a donkey’, a ‘sniffer dog’, a weapons system and a flexible, networked technological platform with multiple potential uses. A development seems discernible in which a single unequivocal identity (‘donkey’) becomes a more complex identity in which the robot is considered a technological platform that can be used for multiple potential purposes (like a smartphone). What is relevant here, is that these differences are related to the question of how the artifact relates to structured activities in the wider sociotechnical system, making the question of the robot’s identity a sociotechnical rather than a limited technological one.

The artifact and the sociotechnical layers

Whether a robot is interpreted as a donkey, sniffer dog or weapons system, depends on how it is integrated in an organisational framework. In incremental innovation, existing structural frameworks largely define human activity and define the role of technological tools. In modular and architectural innovation, the structural frameworks themselves are part of the innovation process, and in radical innovation the strategic role of an entire system is rethought in relation to a larger ecosystem. This section relates the different kinds of sociotechnical innovation to the activities within the RAS project.

Incremental sociotechnical innovation

Incremental sociotechnical innovation refers to changes at the individual level (task design) (see Table 7.1). Integrating the THeMis within a platoon does have several of such implications. In particular, respondents told us about the significance

of the cognitive demands that operating the robot places on the operator (which relates to human-machine interfacing). In one particular developmental trajectory, an innovative feature allowed the robot to ‘follow’ the steps of a specific soldier, thus simplifying the task of controlling the robot. In essence, this feature simplifies the task of remote control. When the task of operating the robot is less demanding, it places less of a burden on other processes within a platoon, making integration of technology easier. Sociotechnical innovation at this level is closely or even seamlessly ‘entangled with’ technological capabilities and interface design and it indicates that the focus was not merely on integrating a particular artifact. This is quite different from artifacts that are acquired off-the-shelf.

Technological malfunctions were the main challenges that were reported to us. In fact, there were so many problems with the robot that testing itself became problematic. All too often soldiers found that tests were stopped after only a few minutes because of technological niggles (e.g., a faulty battery, or sensors blocked by mud). One platoon commander told us that he felt they were doing Research and Development for the manufacturer, rather than technological or sociotechnical innovation.

Modular sociotechnical innovation

Modular sociotechnical innovation refers to changes within the boundaries of a subsystem. At the modular level, the question is how integrating a robot affects the way an infantry platoon operates. Ultimately, the question is whether using a robot outweighs the costs of operating it. Members of the RAS-cel, the battalion staff, and platoon commanders told us that each soldier dedicated to operating the robot has an impact on the existing operations within a platoon. Clearly, the process of integrating a donkey is very different from integrating a weapons system or a networked sensor platform into an infantry platoon. In the latter scenarios, the robot likely will need to be equipped with a camera that produces images that need to be monitored. Operating the robot with this additional functionality might require an extra soldier with consequent operational implications (e.g., situational awareness) at the platoon level. While certainly more ambitious, the latter two options potentially create a more complicated relationship with operational scenarios and therefore might require qualitatively different operator input and different operational procedures.

Platoon commanders indicated that at the modular level they focused on existing operational scenarios. The experiments focused on performing well-defined tasks with an integrated robot (developing a new infantry operations manual). A specific experiment at this level might for example focus on developing tactical procedures for transporting wounded soldiers using the robot. This is a limited form of sociotechnical innovation because it approaches a platoon as a self-contained entity

with a given output and given capabilities. One platoon commander suggested that this approach was necessary because other more advanced forms of innovation were not sufficiently concrete to allow realistic testing. This suggests that some test platoon commanders felt trapped between a technology that did not work properly and more ambitious scenarios that were not sufficiently specified.

Architectural sociotechnical innovation

A robot might be integrated in such a way that its impact on roles and relationships extends beyond a single group or a platoon. Architectural sociotechnical innovation refers to challenges at the level of a cluster of subsystems. In this case, technology, actions and structural frameworks interact in different ways, and the discovery of such options might facilitate new meanings of ‘the artifact’. Architectural innovation then might relate to an infantry company (a cluster of platoons) or the infantry battalion (a cluster of companies). As a battalion is an organisation of around 600 people, in a process of architectural sociotechnical innovation, the robot relates to a much more complex web of activities, a more complex structural framework and perhaps to other artifacts (for example drones). Architectural sociotechnical innovation will therefore inevitably affect the modular and incremental levels.

At the time of the interviews, the infantry battalion in Oirschot was in the early stages of experimenting with architectural innovations. One architectural issue for example was whether to concentrate robots in a single platoon (leaving the other platoons in a company the same), or to distribute several robots across all the platoons in a company. In this case, changes are made to the way tasks are divided within in a cluster of subsystems and the way the resulting system is managed, while the boundaries of existing subsystems within a battalion are still taken as a given. As robots could potentially enable new operational concepts with subsequent effects on the traditional layering of an infantry battalion, this is a limited form of architectural innovation. One interviewee from the armed forces’ central innovation staff suggested the possibility of a new operational concept based on a distinction between sensor, shooter and operator. This suggests different types of robots (sensors and shooters) that are integrated in an as yet unspecified way within an infantry battalion. Such a new operational concept could potentially lead to a new organisational design of the battalion.

Radical sociotechnical innovation

Radical sociotechnical innovation refers to challenges with effects beyond a system of strategic importance. If the ambitions of the project are radical, the other levels will inevitably be affected. The interviews made it clear that robotisation is

generally seen as potentially bringing radical innovation to the brigade. Several interviewees, both within in the RAS Cell, the Brigade staff, and the senior levels in the Army, emphasised the aim of the RAS project was ‘to go from A to B’, rather than ‘going from A to A+’. As such they emphasise the ambition to take a qualitative step in the performance of the brigade, rather than a step towards optimisation. Interviewees from the brigade staff and CD&E emphasised that multiplying the capability of an existing army brigade by three was seen as a ‘reference point on the horizon.’ In essence, this is about articulating a massive transformative purpose that explicates an imaginary endpoint on the journey ‘from A to B’.

Integrating a weapons system into a robot is a development with potentially radical implications. Both the brigade and the higher echelons of the Army supported this development, believing that a weapons system would help address the brigade’s existing shortage in firepower. As the unit of combined arms in army operations is roughly 2,500 soldiers, radical sociotechnical innovation raises the question of a brigade’s position in possible future land operations. Other radical scenarios were considered, relating to the way advanced sensors could be used in Army operations. Robots equipped with advanced sensors could be used to collect data and potentially different robots can be connected in a network. This could lead to the additional question of who controls data within a brigade (is there a need for a data-fusion cell at staff level?). This can give a platoon capabilities that are ordinarily the prerogative of other parts of the military organisation (also for legal reasons). Some respondents explained to us that adding advanced sensors to an infantry platoon (whether bolted onto a robot or not) creates opportunities for ‘strategic compression’ (bringing the strategic, operational and tactical levels of the organisation closer together) and indicated that constraints of existing brigade concepts limit the ability to explore opportunities in this realm.

Radical scenarios made the innovation project much more complex as more stakeholders became involved. Experimenting with weapons systems on robots introduced new strategic considerations and triggered higher political and governance levels in the Ministry of Defence. Equipping an autonomous vehicle with a weapons system brings what might previously have been perceived as a ‘donkey’ into controversial discussions about autonomous or automatic weapons and how to ensure *meaningful human control* (with subsequent implications for operational scenarios and tactical procedures). Furthermore, defining the artifact as a weapons system creates a link to the ‘material organisation’ in the Ministry of Defence (called COMMIT). This department is functionally separate from the operational commands in the Netherlands armed forces and is – for example – responsible for the testing/ certification of weapons systems before they can be deployed. Attaching a weapons system to a robot means transforming it from an experimental test vehicle to an official weapons system requiring certification.

Since COMMIT was not directly involved in the project, it was initially reluctant to cooperate, and testing the modified vehicle would significantly increase costs.

The radical scenarios also brushed against the intentions of CD&E. Some of the interviewees from this department defined the project as an experiment with technological development in the narrow sense, in particular an experiment with vehicle autonomy in rough terrain. They expressed that the link with the brigade in Oirschot caused a shift in the orientation of the project (from technological innovation to moving the brigade from A to B). The interviews revealed that there was no consensus within CD&E about this issue. In contrast, one particular staff member of the brigade remarked that for CD&E ‘concept development’ means developing technological concepts, whereas for the brigade concept innovation means the development of operational concepts. This misalignment led to a complex situation in which the brigade, RAS Cell, and Army leadership pursued radical ambitions, while CD&E’s stance remained divided. However, to frame this as a conflict between conservative technological development and radical sociotechnical change would be an oversimplification, as radical ambitions still rely on technological progress.

Conclusion and discussion

In this chapter we focused on the challenge of scaling innovations in multilayered sociotechnical systems, defined as a challenge of moving from prototype to viable solutions that form a key part of the organisation’s operational core. The analysis showed that this is a distinctly non-linear challenge. Simultaneously questioning the interaction of technology, human activity and structural frameworks can quickly lead to overwhelming complexity. In the RAS project, we saw relevant activity in all four types of sociotechnical innovation. However, these activities were sometimes disconnected across levels and locations, in an expanding stakeholder network, and based on different and sometimes contrasting assumptions. For example, initiatives to radically transform the brigade coexist alongside initiatives based on existing infantry doctrine, apparently without any sense of separation. More specifically, we have identified three key findings related to the challenge of scaling innovations.

Sensemaking at different levels within the sociotechnical system

Our findings suggest that not only does the structural framework interact with the sensemaking process of attributing meaning and resulting ambitions to the artifact, but that this interaction also leads to different outcomes across specific levels and functions of the organisation. Examples include the interpretation of TheMis as an enabler of operational concepts to address the existing lack of firepower at brigade

level, the interpretation of TheMis as a technical experiment in autonomous navigation by CD&E, and the interpretations at platoon level in terms of durability and valence in their current technical doctrine (see our analysis of radical social technical innovation in section 5). While this may seem straightforward given the different structural elements and beliefs at different sites, the lack of an apparent shared sensemaking process about what the new technology might afford, appears to inhibit the alignment of action within the sociotechnical system. Furthermore, sensemaking processes at each level were found to evolve over time, under the influence of new insights and in response to feedback from other levels within the organisation. In essence, the challenge of understanding what new technology is and what it signifies within a sociotechnical system is a complex issue that demands a multilevel approach.

Multi stakeholder sensemaking process in complex networks

Another key issue that materialised was the emerging complexity of the stakeholder network surrounding the initiatives in the brigade. This increases the interaction between stakeholders, each bringing different perspectives and meanings to the artifact. It is not merely a policy process of defining what is feasible within the bureaucratic system; it is also fundamentally a complex sensemaking endeavour or a discovery of affordances. Even the most straightforward attempts at sociotechnical innovation at the incremental and modular level involved a network of external parties. For example, in the case of technological failures, the manufacturer might be involved. In more complicated scenarios this stakeholder network becomes more complex. COMMIT becomes involved when testing with guns on robotic platforms and the staff of the brigade need to be involved to manage those relations. In fact, the brigade staff (several echelons above the testing platoon) become involved because many minor bureaucratic issues can only be resolved at a high level. The latter refers to ambitions to integrate the TheMis into an international military exercise in Lithuania. Depending on the identity of the artifact, a different network of external stakeholders may be involved and different everyday issues might require coordination at very high levels (beyond the brigade). So, while incremental and modular innovation may appear to focus on clearly delineated (satisfyingly) pragmatic issues, the complexity of the governance network surrounding the brigade may make this exceedingly complex.

Mismatch between affordances and structural framework

Regarding the structuration around the RAS case, we also identify a mismatch between the degree of control over the realignment of organisational structure and knowledge of the implications of technological affordances in relation to the

structural framework. For example, at the platoon level (micro level), experimentation and exploration of the affordances of the THeMis generates strategic input needed to inform adaptation to the structural framework (e.g., HRM, organisational structure, or doctrinal development). However, the discretion to reform these aspects of the structural framework lies with other elements of the organisation. This may be partly explained by the specific and highly hierarchical, bureaucratic structural framework in our case, but it also suggests that the understanding of what technology is and what it means may be decoupled from the ability to align this understanding.

While these points could be understood as a criticism of the way the RAS-project was managed, we would rather emphasise that they are to be expected in a non-linear challenge of scaling innovations in a multilayered sociotechnical system. While the question “What is the artifact?” may seem almost too straightforward to be a real challenge, making sense of equivocal artifacts is an essential part of an ambitious innovation project. This requires both experimentation and discovery of the implications for structural frameworks at micro, meso and macro levels, in essence a process of sensemaking combined with one of designing. Our conclusion is therefore that this process requires a strategy for sociotechnical innovation that takes this process into account and that allows for multi-level coexistence of sensemaking around new technologies while continuously (re)adjusting the discretionary flexibility of the structural framework. Recognising the importance of developing such a strategy might be one of the key outcomes of the RAS project.

Notes

- ¹ Eric-Hans Kramer, et al. “Revisiting the synthetic organization”, 495–512.
- ² Ministerie van Defensie. “*Defensievisie 2035*.”
- ³ Kramer and Moorkamp, “Uitdagingen voor de militaire organisatie van de toekomst”, 73–83.
- ⁴ Rogers, *Diffusion of innovations*.
- ⁵ Rogers, *Diffusion of innovations*, 6.
- ⁶ Rogers, *Diffusion of innovations*, 24.
- ⁷ Pasmore et.al., “Reflections: Sociotechnical systems design and organization change”, 67–85; Mohrman et al., *Designing from the future*.
- ⁸ Tärnholm and Liwång, “Military organisations and emerging technologies”, 37–48.
- ⁹ Kramer and Van Os, “Digitalisation, organising and organisational choice”, 25–50.
- ¹⁰ See for example, Sauli Niinistö “Safer together. Strengthening Europe’s civilian and military preparedness and readiness”.
- ¹¹ Jun and Weare, “Institutional motivations in the adoption of innovations”, 496–519.
- ¹² Van Os and Kramer, “Technologische ontwikkelingen als ‘wicked problem’”, 57–72.
- ¹³ Verkerk, *Trust and power on the shop floor*.

- ¹⁴ Weick, *Making sense of the organization*, 148.
- ¹⁵ Ibid.
- ¹⁶ Jasanoff, "Imagined and invented worlds", 321–342; Van der Maarel et. al., "This is not what I signed up for".
- ¹⁷ Kramer and Van Os, "Digitalisation, organising and organisational choice"; Verkerk, *Trust and power on the shop floor*.
- ¹⁸ Orlikowski, "The duality of technology", 398–427.
- ¹⁹ Orlikowski, "The duality of technology", 401.
- ²⁰ Orlikowski, "The duality of technology", 403.
- ²¹ Trist, "A socio-technical critique of scientific management".
- ²² Kramer and Van Os, "Digitalisation, organising and organisational choice", 31–32.
- ²³ Orlikowski, "The duality of technology", refers to the interpretative flexibility of technology.
- ²⁴ Zammuto, et al., "Information technology and the changing fabric of organization", 749–762.
- ²⁵ Orlikowski, "The duality of technology".
- ²⁶ Weick, *Making sense of the organization*, 161.
- ²⁷ Bate, Kahn and Pye, "Towards a culturally sensitive approach to organization structuring", 199.
- ²⁸ Hanelt et. al, "A systematic review of the literature on digital transformation", 1159–1197.
- ²⁹ Hanelt, "A systematic review of the literature on digital transformation"; Sascha Kraus, et.al, "Digital transformation: An overview of the current state of the art of research", 1–15; Kramer and Van Os, "Digitalisation, organising and organisational choice".
- ³⁰ Jun and Weare, "Institutional motivations in the adoption of innovations", 496–519; Lauri Wessels, et.al, "Unpacking the difference between digital transformation and IT-enabled organizational transformation", 1–57.
- ³¹ Jun and Weare, "Institutional motivations in the adoption of innovations", 500; Tobias Kretschmer and Pooya Khashabi, "Digital transformation and organization design: An integrated approach", 86–104.
- ³² Kretschmer and Khashabi, "Digital transformation and organization design: An integrated approach"; Van Os and Kramer, "Technologische ontwikkelingen als 'wicked problem'".
- ³³ Kramer and Van Os, "Digitalisation, organising and organisational choice", 36–39.
- ³⁴ Rebecca Henderson and Kim Clark, "Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms", 9–30.
- ³⁵ Kramer and Van Os, "Digitalisation, organising and organisational choice", 37.
- ³⁶ Barley, *Work and technological change*.
- ³⁷ Fioravanti and Velho, "Does Actor-Network Theory have anything to contribute to science journalism?".

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Readiness through scalability: Structuring the military for large scale combat operations

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Abstract

This chapter examines how to implement scalability in military structures and mobilization processes, using the Dutch Armed Forces – particularly the land component – as a primary case. Starting from the requirements of large-scale combat operations (LSCO) and working backward, it identifies which capabilities and configurations are crucial for high-intensity warfare. From these, subsets suitable for dormancy are determined, contingent upon well-defined activation procedures. Credible scalable forces thus hinges on rapid transition from peacetime to wartime configurations, supported by clear directives and rehearsed mobilization measures.

Keywords: Scalability, LCSO, Dormant Organisations, Configuration, Operational Readiness

Introduction

‘Readiness becomes an issue when peace comes into doubt.’¹ This quintessential aphorism of military readiness assessment, written some thirty years ago, still rings true. And, more importantly, today’s peace has come into doubt.² Readiness assessment is therefore more important than ever. This chapter explores the potential of scalability in ensuring readiness for a small nation like the Netherlands for large-scale combat operations, or, as the Dutch Ministry of Defence calls it, the possibility of a full-scale military conflict.³ Scalability offers a pathway to bridge readiness gaps while balancing operational demands with resource constraints. The chapter first offers a conceptual framework for readiness, dividing it into the operational, structural and mobilisation level. Next it analyses how scalability can be implemented at the structural and mobilisation level. In each of these sections, the Dutch military is used as a starting point, with particular emphasis on the land component preparing for large scale combat operations (LSCO).

Operational, structural and mobilisation readiness

Military capabilities are more complicated than just the addition of all property owned and all personnel permanently hired.⁴ For example, a missile is not doing anything on its own but is only effective in combination with a launch platform and personnel to operate it (which in turn relies on a supply chain, intelligence, training, etc.). A capability is the *designed effects* when all resources are brought together. On paper, a missile + platform + personnel (+ support) = capability to strike a target from a great distance. The assurance that this effect can be actualised is by assessing the readiness of all assets involved. As military capabilities are not actually used on a regular basis, readiness assessment is a crucial factor in determining which capabilities are ready.

For the purpose of this chapter, I will use a tripartite division into operational, structural and mobilisation readiness, derived from Richard Betts' seminal work *Military Readiness*.⁵ Betts argues that while operational readiness can be defined as 'how to optimize the performance of some *given* force within the *shortest* time,' readiness can also be thought of as 'how to get a force as powerful as is *needed* within a *sufficient* time.'⁶ This follows from Betts' crucial intervention in the academic discussion on readiness by splitting readiness up into the three questions: 1) Readiness for when, 2) Readiness for what, and 3) Readiness of what?⁷ He thereby brings into focus that readiness ultimately is about achievable effects (outputs) rather than available resources (inputs). Even though thirty years stand between us and Betts' arguments, readiness assessments have never quite shaken the accusation that there is too much emphasis on the inputs.⁸ This orientation towards what can be done with a given input could be excused when doing only counter insurgency operations, but when a nation is faced with a symmetric opponent who just might make the first move, the *for what* and *for when* questions are answered in large part through our adversary. In other words, the direction of thinking about readiness should be reversed. If previously the evaluation centred on what kind of outputs can be achieved without changing the input, it is now necessary to start thinking about how the input can be changed in order to achieve the needed output.

Operational readiness is the ambition to optimise the shortest time in which a given force is ready.⁹ For this purpose, protocols and tests are put in place, such as NATO's CREVAL, that 'certify' a unit at a certain operational readiness level. While it may seem reasonable to assume that the readiness of full-time employed military personnel in combination with owned equipment should be very high, the truth is that this is very much in doubt. An EU report on military readiness notes that about ten years ago official estimates put operational readiness at only 30% of (land based) capability, and that NATO's current ambition is 50% readiness.¹⁰ Experts doubt whether NATO is currently at this percentage, noting reluctance

from member states to allow readiness assessments.¹¹ While this may be a serious issue in need of addressing, this chapter focuses on the application of scalability to the other two levels of readiness, as scalability for operational readiness can for the most part only be achieved through scalability of the other two levels.

Structural readiness is the full set of capabilities as the military is designed on paper. As Betts puts it, 'it establishes the limits of organized potential capability in existing forces.'¹² He likes to call this the 'mass' of the military. This word, 'mass', is useful to think of when comparing two parties and their readiness, both structural and operational. We may draw here an analogy with Newton's second law of motion, the Momentum (analogous to total Actual Capability) of an object is equal to Mass (analogous to structural readiness) times Velocity (analogous to operational readiness). While 'mass' as a term is still used in this sense, and is considered a crucial factor in LSCO of today and the near future,¹³ especially sustaining the fight, the increasingly hybrid- and technological nature of modern warfare should make us aware that specific ways in which this mass is organised add to, and sometimes multiply, the effects.¹⁴

With mobilisation readiness, Betts explicitly does not think of the scenario of making the entire military structure operationally ready (by, e.g., calling up reservists and filling ammunition warehouses to the brim), but 'the reconversion of industrial and manpower resources into military forces on a grand scale comparable to past mobilisations for major war.'¹⁵ In other words, mobilisation readiness is about the ability to balloon up the military in an existential crisis akin to the world wars. The cost of structural and operational readiness is usually expressed as a percentage of GDP, based on a calculated balance between how much money is needed to defend the society and economy this GDP represents, versus how much of our own money we are willing to not invest directly back into our society. As is well known, NATO stipulates 2%. In times of all-out war, this percentage is upped to gargantuan proportions, taking up as much as 40% to 70% of GDP.¹⁶ In other words, whereas in limited conflicts, the military structure would be positioned to solve the conflict, in an actual, major war, the economy itself and, in essence, the whole of society, would be positioned to solve the conflict. Preparing a playbook which sets out the phasing and coordination of such a conversion to wartime economy, preemptively identifying and solving bottlenecks, is what mobilisation readiness is about.¹⁷ To defend society, we need to have capabilities for three general scales of conflict, i.e., *operational readiness* to engage immediate, small-scale threats; *structural readiness* to deter large-scale threats, now and for the immediate future, and *mobilisation readiness* to ultimately come out on top in full-scale conflicts.

To do all of the above, one could imagine spending as much money as is needed on a very large standing army that is manned, trained, equipped and ready to do all those things. The military would then be able to perform all its tasks by

itself, without delay. In practice, hard choices will always have to be made, even for countries that spend enormous parts of their budget on the military, like the US or North Korea.

For small nations who wish to limit their military spending, these choices are even more pressing. One strategy which purports to spend money wisely will be explored in this chapter. This is scalability. Military scalability as an investment strategy is a promise: whereas we are not ready now, scalability is the assurance that we will be ready in time. Put differently, scalability is a form of hedging. It protects a society from spending too much money on preparing for a war that is never to come. It does so by not investing in obtaining the needed capabilities (for e.g., protracted LSCO) right now, but only invests in *being able* to have the needed capabilities when the time comes. But how can scalability be best executed from a readiness point of view? Let us consider the application of scalability within structural readiness and mobilisation readiness.

Designing scalable structures

To maintain peace, a society needs to engage in the constantly shifting geopolitical power balance. In one form or another, it therefore needs to deter large-scale threats, now and for the immediate future. If the combined capabilities of a military structure does not match or exceed that of potential adversaries, it cannot credibly fulfil its duty of deterrence, and needs to be made structurally ready.

The Dutch need for scalability

Since the 2000s, the Dutch, like many small European nations, have involved their military mostly for counter-terrorism (CT) and counter-insurgency operations (COIN). These CT and COIN operations fell within their constitutional mandate, as they were seen to promote international legal order and support civil authorities. The Dutch built enough capability for this to be known around the world as the “Dutch Approach”.¹⁸ With the rising prominence of the primary responsibility for protecting Allied and Dutch national territory, this suite of capabilities does not fully meet its required output. In a NATO capability review of the Dutch armed forces (dated June 2024), it is noted that all three infantry brigades suffer from low readiness with two medium infantry battalions and a heavy infantry battalion entirely missing, while all three brigades are actually expected to be operable concurrently and also be supported by the Dutch themselves.¹⁹ As such, the land component is characterised as having ‘serious structural weaknesses’ and the review concludes that the Netherlands ‘cannot deliver the forces and capabilities

agreed and expected in contribution to the deterrence and defence of all Allies.²⁰ As peace has come into doubt, the noted lack of readiness needs to be addressed.

Next to an overall increase in budget and specific acquisition of new capabilities (such as tanks and cyber assets²¹), the Dutch Ministry of Defence proposes ‘scalability’ as an important solution to its unreadiness.²² Scalability is supposed to enable tasks:

- From very simple to very complex
- From very small to very large²³
- From very gradually emerging to occurring very sudden
- From very short to very long²⁴

Furthermore, the ministry mentions several areas of implementation. For example, scalability is to be achieved by altering the personnel policy and adopting labour-extensive technology,²⁵ by interoperability and standardisation,²⁶ and through pooling and sharing.²⁷ From all of this, the impression emerges that scalability means that there are mechanisms in place that would enable the organisation to temporarily grow in order to become capable of doing certain tasks, while the base capacity of the organisation is much more lean and clearly unfit to organically take on the full gamut of tasks.²⁸

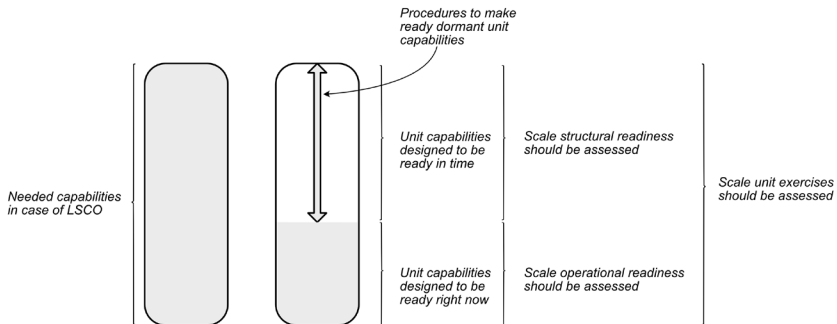
Military scalability design

Military scalability is patently different from scalability for businesses. For businesses, scalability is often seen as a desirable path towards continuing growth.²⁹ This is especially applicable to businesses relying on software technology and the internet, which can expand their markets more easily than brick-and-mortar stores. Businesses which successfully pursue this strategy are themselves often called ‘scale-ups’.³⁰ However, the military *needs* to scale to the capabilities required in the direst, yet conceivable scenarios. Thus, scaling up is not just a desirable path but an absolute need. Furthermore, near-infinite scaling is not necessary, as it only needs to scale to meet its needs for conceivable scenarios.

This necessary yet limited type of scaling calls for a specific design of military capabilities. An important deduction from the above is that scalability of a unit is not about scaling up (above its designed strength), but about designing it with all the capabilities needed in very complex, large, sudden or long tasks, and then in reality, for the moment, restricting the unit to only a portion of these designed capabilities. It may look like scaling up from the outside, but on paper these capabilities were always there. Whether we speak of a fire team, company, corps, or the entire armed forces, their necessary military capabilities derive from a given scenario.

Scaling beyond the design requires a redesign which would delay the process so much it defeats its purpose. Not only are design processes lengthy, but a unit is seldomly designed in a void and virtually always in a delicate balance with other units such that, ultimately, the combined arms are capable of taking on the complex tasks that real life demands of us. A corollary is that the restraint is part of the design and that measures to regain what was left out are preplanned. The following figure (8.1) is the most simplified visualisation of this model:

Figure 8.1: Scalable structural readiness of a military unit (C. van Lit).



Thus, a unit is structurally scalable when its blueprints define or allow for a much larger set of capabilities than it is currently outfitted with. Typically, we think of this as the number of personnel, i.e., the unit is designed for a thousand pax but is currently filled with only a hundred. Capabilities can, of course, also be achieved through specific training levels, equipment, supplies, and exercises.³¹

Assessing readiness of scalable units

Such scalable readiness demands a lot from commanders and staff, who now have to prep their organisation on three levels.

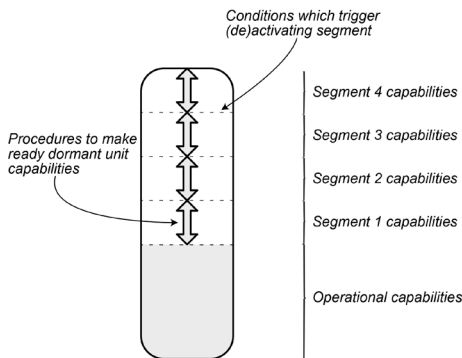
- They need to get familiar and work with the resources actually given to them (personnel, materiel, training, etc.). This can broadly be approached as one would normally do, i.e. most military units follow a cycle *reset – train – available*, with the *train* period used to ‘certify’ a unit for operational readiness.
- Commanders and staff also need to assess their scalability by experimenting and trying out their procedures to fill dormant capabilities. Since these capabilities are part of the unit’s design, it stands to reason that the unit commander is familiar with the scalability procedures, even if the go ahead and execution of those procedures are done from outside the unit (e.g., headquarters).

- Most importantly, the commander and his staff, when doing exercises (that is, the entire unit is practicing a scenario), need to do their planning (both process and resulting OPORD) and their real time command as though all capabilities are present. The point is not to measure the performance of those capabilities currently not there, but to experience the full amount of information the commander needs to process and appreciate the amount of manoeuvrability and sustaining power of his entire unit.

Segmentation design

The scalability itself can be incorporated in different ways, falling under two major approaches: iteration or transformation. With iteration, the dormant capabilities are segmented and attached to clear triggers. Clear triggers (e.g., enemy has amassed *X* amount of capabilities within *Y* distance of the border) will give little room for discussion both within the unit and between unit and higher command on whether to scale up or down. A segmented system, in which tranches of capabilities are placed in different scales, which the unit can traverse scaling up or down, make the procedure for scaling simpler because less capabilities need to be added at once which will benefit the successfulness of scaling. Additionally, segmented scaling gives less shock to the unit’s integrated readiness. Obviously, the best moment to scale up/down is during *reset*, so that the scaled unit can get operationally ready as a whole during the *train*-phase. The following figure (8.2) illustrates the model:

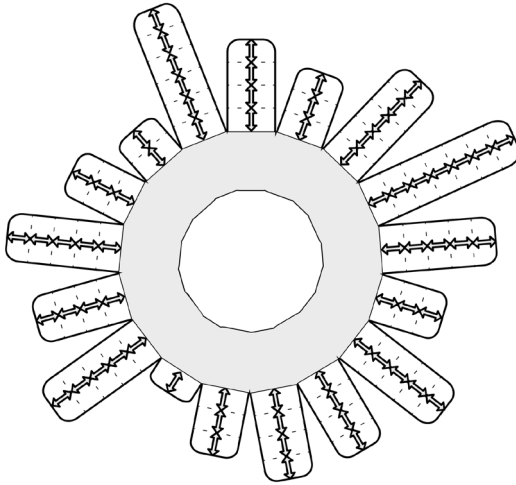
Figure 8.2: Tiered scalability of a military unit (C. van Lit).



Most units within a military consist of sub-units (e.g., a brigade is made up of battalions, each consisting of companies, etc.). The above model can be used to give a general sense of elevated (or decreased) level of activated readiness. Obviously, the overarching unit can be split into its distinctive sub-units in which each can

have their own iterative scalability model, which can operate independently. The following figure (8.3) illustrates the idea:

Figure 8.3: Model of a scalable unit (C. van Lit).



The grey ring is the base capabilities of the entire unit. Each spike shows the tiers on which a sub-unit can scale. Using this as a design principle will ensure flexible scalability. Moreover, it can also help once the unit is beyond the design phase and actually in use, by shaping dashboards to oversee the state of affairs the overarching unit currently is in. Designing scalability sensibly thus contributes to the manageability of large and complex units.

Another method of scalability is transformation. In this case, the unit jumps from one configuration to the next, like a caterpillar transforming into a cocoon and next into a butterfly. Not only does this come with jumps in capabilities, but the entire internal structure of the unit is radically different. In business, this is well known as the different stages a company encounters as it grows.³² For example, it is well documented that a company needs to transform into something else once it has more than just a handful of employees. In the early days, the owner could be the creative entrepreneur and the managing director at the same time. The handful of employees knew what everyone else was doing and could organically collaborate and hand over tasks. But when more than twenty or so employees are involved, all of a sudden there needs to be a much stricter division of labour, processes need to be determined and supported by SOPs, standard lines of communication need to be enforced, the owner preferably needs to hand over the day to day management to

someone else, and so forth. Rarely is this change foreseen and predetermined. More likely it will be started by one or more moments of crisis. These give rise to a new form of the company or, alternatively, it goes under. In the military context, such an identity crisis should be avoided at all costs. Transformative scalability, then, can only be successful for the military if these different stages have been preplanned and the moments of transforming to the next stage are predetermined. In general, as you may have surmised, transformative scalability is not recommended. Iteration allows for much more closely controlled scaling. This will have the additional benefit of projecting more strength and determination. It could be that for some parts of the military design, transformative scalability is unavoidable. In this case, it is recommended to carefully describe the risks involved in such a design choice.

Generic examples of restraining capabilities

In general, there are several ways of restraining a unit thoughtfully.³³ One can leave seats (or equipment slots) empty, filling them only when needed. Filling them could come from people who are not yet at the desired skills level, such as reservists, or who are at this level but are temporarily doing something else, such as study or training. Leaving seats empty can be done on a per person/equipment basis, but could also be designed at unit level. For example, the structural design may divide a brigade in three battalions but already stipulates that one is to be left empty. When certain conditions are met, the structural design will have procedures in place to fill in the empty battalion just in time.

One can go as far as establishing a cadre unit: the entire unit (e.g., a brigade) is designed down to the last details of personnel and equipment, but only the seats of the cadre are filled: a headquarters and other staff. If and when needed, enlisted soldiers and equipment can be added to actually fill in the designed unit. An interesting variant on this is a 'collateral unit'.³⁴ In this concept, a selected group within a normally functioning unit is additionally trained to break out and set up an independent unit (either of the same shape and function or something entirely different). The advantage over a cadre unit is that in peace time they are part of a fully filled and normally functioning unit and thus gain valuable experience of the day to day workings of such a unit. The disadvantage is that their main responsibility within their unit must be expendable when they are called upon for collateral responsibility.

A final possibility is reserve units or the relegation of decommissioned materiel.³⁵ These are units entirely filled with part time personnel. A close look at their structural and operational capabilities is important, as they may be cheap to keep in large numbers, but one does not pay for numbers but for capabilities. Studies have shown that the fairly deep use of reservists by the Americans has perhaps not been

cheaper than using active service personnel,³⁶ and similarly experts doubt how much use the Russians are getting out of antiquated tanks taken out of backstock.³⁷

The idea of scalable structural readiness is that even though certain capabilities are not visibly, physically present within a unit, as far as the enemy is concerned, we *do have them*. We are posturing to be the full structure, while only filling a subset. The posturing is, ideally, enough to deter any enemy from threatening our territory. I would maintain that the enemy will only be convinced of our structural capabilities if we are ourselves. This is why it is of the utmost importance that especially commanding officers see and approach the actual unit (as it is resourced now) as a restrained version of the unit it ought to be (as designed on paper). Since peace has already come into doubt, this game of posturing has already begun. As per NATO's evaluation, the Dutch military is unable to sufficiently move real assets to strategic positions and get them in high operational readiness, so we are left with the option to engage in an even colder, more abstract struggle, at the structural level. This is why I would maintain that we should not only train, test, and evaluate (de)activating the different tiers of dormant capabilities, but do so as real operations, for real strategic gains.

Incorporating scalable mobilisation

The sheer immensity of a mobilisation for war is hard to imagine. This is especially true for a country like the Netherlands, which has become accustomed to using its military for COIN operations. These operations typically happen far away from the home land, with a starting date and duration of one's own choosing, and a budget which could be low or high by simply changing the objectives. This fosters an image of the military as a tool to be used by society, without significant ramifications for society itself. The current mindset of the Dutch military leadership seems similar, when it states in the 2024 Defence White Paper that society can contribute 'by staying calm and carrying on while the armed forces are busy winning the war',³⁸ a sentiment which was echoed in Chief of Defence Lieutenant General Eichelsheim's speech during the presentation of the white paper, when he said that 'society should be able to function independently when the armed forces are busy winning battles at the Eastern border.'³⁹

But, unfortunately, the literature is clear about full-scale war: it is measured in GDP and discussed through society's ability to convert to a war economy.⁴⁰ I previously mentioned that up to 70% of GDP was spent on the military during WWII. Today, such numbers still hold true. Ukraine is projected to spend more than 22% of its GDP in 2024, and more than 26% in 2025.⁴¹ On top of that, Ukraine received 202.9 billion euros of foreign aid in 2.5 years of war.⁴² The combined GDP of Ukraine for

that same period was about 398 billion euros,⁴³ making the aid about 51% of GDP. All of this is needed to defend against a military which is by some accounts using only a limited part of its capabilities. It is, then, no longer the mass of the military which is put forward as the means to win a conflict, but the weight of the entire economy. This not only requires ingenuity in turning up the production of materiel and the conversion of personnel, but also the mindset from leadership and the general population that society must be defended at all costs. Temporary setbacks on the battlefield should be deemed alright if the war economy behind it can churn out more and more troops, tanks, and explosives; much more than the enemy.

Scalability can be a meaningful instrument in preparation for this, but only in certain regards. This is because the conversion to a war economy and fighting nation takes a long time. Some things take up so much time, they cannot be hedged as a scalable ability but need to shape society outright.

Shape of society, distance to society

Before we can speak of the possibility of mobilisation, let alone scalable mobilisation, society needs to be in a certain shape. For example, making national infrastructure ready for massive movements of military equipment is for the most part not something which can be designed in a scalable process: a bridge either does or does not support tanks, and a railway either does or does not run in the right direction. It is inconsequential to make a plan for a railway in the right direction but wait on building it ‘when we really need to’, since obviously the execution of such a plan would take longer than the time we know for certain a full scale war is going to happen. Such ‘ready or not’ issues are non-scalable baseline requirements. Without them, there is no need to escalate a conflict because we would not be able to sustain it.

Requirements of this type are often categorised as part of discussions on national (or civil) preparedness or societal resilience, but this is not entirely correct. In the NATO context, such requirements have been defined and promoted since 2016, through the so-called seven baseline requirements.⁴⁴ They stipulate self-sufficiency, sustainability and continuity of government, energy supplies, food and water, communications, and transportation, and the ability to handle mass casualties and displacement of large numbers of people. In the context of mobilisation readiness, these requirements are not just to ‘keep society calm’ while the military is out there fighting. Rather, the baseline requirements become dual-use as a large-scale conflict is heating up, and become highly skewed towards military use towards a full-scale conflict. In other words, while it may seem that society should implement the baseline requirements because its citizens directly benefit from them in times of crisis, the baseline requirements should (also) be seen as a

springboard for society to transfer its assets as smoothly as possible into military capabilities when it is on the brink of full-scale war.

The process itself for handing over society's baseline assets can be preplanned. If this is planned in such a way that this happens gradually, starting when a conflict is still minor, such tried and tested plans could be labelled as scalability for baseline assets. Since these plans describe processes of handing over assets from society, we are basically talking about the optimisation of collaboration between the military and civilian parties (whether public or private). To state the obvious, the further the military is removed from society, the harder this will become to establish.⁴⁵

Furthermore, I would argue that in terms of conceptual design, there is merit to approach this mobilisation scalability similar to structural scalability. Whereas to achieve structural readiness, segments of dormant capabilities are designed to be ready to be (de)activated when needed, civilian dormant capabilities can be designed as part of a unit. As before, we can do this at any level, from a company to an army. However, the lower the intended level, the easier it will likely be to (de) activate, because the activation process will be simpler and less disruptive. This, in turn, is mostly because at a lower level, there will equally be a smaller dormant capability to be (de)activated. This further means that it is easier to set an accurate threshold to activate it and that this threshold will be relatively low. Essentially, at a low-level unit one can design it as a standard operating procedure.

Materiel

In 2021, additional areas of concern were identified by NATO. Next to an explicit mention of civil-military cooperation, innovation and interoperability were mentioned.⁴⁶ These are aspects that influence the scalability of materiel. For LSCO, innovation should consider improving both production quality and production quantity. Generally, innovation answers the requirements for being ready in the distant future. Obviously, if all resources go to keeping the current capabilities operationally ready right now, then in a few years to a decade, your military is obsolete, as adversaries will vastly outperform you with newer capabilities. But 'newer capabilities' run the risk of being equated with 'more advanced', which in turn could be misunderstood for an aspiration to greater capability *per unit*. However, when understanding the full potential of a military, it is not only the capability of a unit that matters, but also the number of units: Force equals Power-per-unit times Number-of-units. Innovation, then, can be equally helpful if it allows for the production of a higher number of units. Indeed, we may go into a conflict with 'short-war delusion', thinking our prowess and technological superiority will seize a quick and decisive victory. But history tells us that grinding exhaustion and attrition are far better strategies for full scale conflicts between large nation states.⁴⁷

As a simple example we can consider how, at the time of writing, armed conflicts around the world have encouraged rapid innovation to incorporate UAVs (drones) into warfare. Deliberate attempts to flood the enemy with cheap and quickly produced UAVs can only be countered by innovating equally or more cheap and quickly produced counter-drone capabilities. Neutralising them with expensive weapon systems can only go as far as one's GDP allows. The belligerent with their flood of UAVs need not develop their UAVs more capably, they only need to continue to apply pressure until the other side has run out of money to defend itself.

Since scalability is inherently a hedging strategy, innovating scalable production heavily favours quantity. If an asset is complicated to make, it will scale badly. If one wants to incorporate scalability in mobilisation readiness, one needs to thoughtfully mix quality-heavy and quantity-heavy capabilities. These aspects are ideally brought in as design requirements in R&D programs.

With interoperability, NATO wishes to encourage the use of the same or similar capabilities across militaries, so that they more easily integrate into a unified force. This has the benefit of unifying production, which allows for a higher base level production. In general, a higher base level is desirable, as it is therefore more likely that the production process is already ready for increases in production. However, a higher base level production goes against the very idea of scalability, which would encourage a low base level production with only the promise of becoming greater if needed. When things work out well, this means we can have the best of both worlds: by engaging in multilateral production lines we can ensure a relatively high base level production without having to pay for it. A downside to this is that when we do wish to scale up, we are only one of many customers. Moreover, quite likely one nation will be dominant in the production line and this will make us reliant on good relations with this country. Generally, the closer this scalable production is integrated within one's own society, the better.

Personnel

Within the limited scope of this chapter, I lastly wish to touch upon the issue of personnel, since it is often thought of as the central element of mobilisation. And it is true; in a full-scale war, it is all hands on deck. Allocating double digit percentages of GDP to the war effort still needs to translate into actual people busying themselves with it. As this is one of the most visible and impactful effects, mobilisation readiness is usually at first understood as 'mobilisation of people'. Scalable readiness in this regard means there is a reservoir of people and a meaningful process to take them in. It would seem that the Army Reserve is a first call for this process, but this entirely depends on a country's setup. For example, Russia has over two million (voluntary) reservists,⁴⁸ or 1.4% of its population. For the Netherlands, 1.4% would

be a reservists pool of about 250,000 people, while in reality it has only around 7,500 reservist.⁴⁹ Consequently, Russia can use its reservists pool to scale up, while the Netherlands cannot. On the other hand, the Netherlands trains, equips and keeps investing in its reservists such that it can be better appreciated as part of its structural readiness than its mobilisation readiness, while Russia has not done so. When Russia activated a portion of their reservists in 2022, they still needed to be assessed (e.g., medically), organised, equipped and trained.⁵⁰

Moreover, in a full-scale war, much more would be needed than 1.4% of the population. In the Second World War, between 7% and 13% of the population was militarised.⁵¹ Perhaps a technologically advanced battlefield needs fewer people, but Ukraine, for instance, saw a tenfold increase between 2013 and 2024, growing from around 120,000 to about 1.2 million.⁵² Getting ready for such a scale is a lot easier when a military does not have to consider the volition of military aged men. Finland, for example, seems to have had detailed plans to scale up to a 280,000 pax force since 2017, but does so by a year-long mandatory conscription followed by automatic enrolment in the army reserve.⁵³ Furthermore, all men aged 18–60, regardless of health or other circumstances, are registered to a so-called ‘auxiliary reserve’.⁵⁴

Perhaps a scalable middle-ground can be found. The “voluntary conscription” which the Dutch have introduced, through which people can serve for a year without strings attached, is a great example.⁵⁵ Another approach is to test the draft, by requiring a small percentage of men who, when of military age, participate in the first stage of mobilisation. This would be a real-life exercise for the military towards the planning, logistics, and execution of inducting these men, and would give estimates of how many of the population are physically and psychologically fit to serve.⁵⁶

Recommendations

A scalable military is reached by designing units (defined here as bundles of capabilities, whether at the level of company, brigade or entire army) with LSCO in mind and working backwards to figure out which capabilities are needed. Of those needed capabilities, subsets need to be identified that can remain dormant. Only if and when clear procedures to activate these dormant capabilities are defined, will this produce a credible deterrent (and actual asset in armed conflict). These dormant capabilities should be segmented; the smaller the segments the better, as this allows for very gradual scaling up and down. Rehearsals of (de)activation and designing unit-wide exercises which include (even if only on paper) the dormant capabilities will provide commanders and their staff the confidence and experience of their full capabilities.

No matter the circumstances, mobilisation readiness deserves attention, as it strikes at the heart of a society's existence. Scalability can play a part in this, but only works if the distance between the military and society is minimised, both in an actual, organisational sense, and also in our mindset. Much like dormant military capabilities, civilian cooperation can be designed too as capabilities attached to units. Since full-scale war is a drawn out game of liquidating a society's GDP into military capabilities, attention in R&D needs to be given to the ability to produce a new capability quickly and cheaply.

Scalability is a way for society to preclude wasting money on military capabilities it actually doesn't need. Done wisely, society can still posture the necessary strength and, if ultimately needed, actually enforce it. This does require coming up with correct answers to the questions Ready for what? Ready for when? As answers to these questions evolve, so should our scalability.

Notes

- ¹ Betts, *Military readiness*, 35.
- ² Many European ministers of Defence, generals, and analysts could be cited but I shall keep it to the opening words of the Dutch minister of Defence in the presentation of his plans for 2024: 'After a long period of peace in Europe, we must now get used to the idea that we too may be drawn into armed conflict.' *2024 Defence White Paper: Strong, smart and together*, 3.
- ³ *2024 Defence White Paper*, 8, 11, 21, 22, 40, 54, and 59.
- ⁴ I am thinking of 'capability' as a variant on NATO's 'fighting power,' which represents 'the ability of the armed forces to shape, contest and fight' and combines combat power (means to act), fighting spirit (will to act) and operational art (ways to act), cf. *Allied joint doctrine*, 49.
- ⁵ Other layers of readiness can be considered too, but fall outside the scope of this article. Cf. Galvin, *National preparedness and military readiness*.
- ⁶ Betts, *Military readiness*, 37.
- ⁷ Betts, *Military readiness*, 33.
- ⁸ Harrison, "Rethinking readiness", 38–68; Watts et al., *Rethinking readiness*.
- ⁹ There are other ways to divide up operational readiness, such as ability levels, cf. Herrera, *The fundamentals of military readiness*.
- ¹⁰ Niinistö, *Safer together*, 124.
- ¹¹ Deni, "The new NATO Force Model: Ready for launch?"; 4; Hackett and Schreer (eds.), *Building defence capacity in Europe*, 6; Monaghan et al., *Is NATO ready for war?*, 13. The last analysis does state that NATO could be rated 'ready to fight tonight' but cast doubts over sustaining a protracted war and being ready for warfighting of the future.
- ¹² Betts, *Military readiness*, 41.
- ¹³ TRADOC, *The operational environment 2024–2034: Large-scale combat operations*, 10, 13.
- ¹⁴ Betts is aware of this aspect but does not integrate it fully into his thinking, cf. Betts, *Military readiness*, 42–43.
- ¹⁵ Betts, *Military readiness*, 211.

- ¹⁶ All major parties of WWII spent this much, see Harrison (ed.), *The economics of World War II*, 21. For a detailed study of how Britain attained more than 40% during WWI, see Ellison et al., “Funding the Great War”, 60.
- ¹⁷ Betts, *Military readiness*, 215–217.
- ¹⁸ Many articles could be cited, but see e.g., Moelker, “The genesis of the ‘Dutch approach’”.
- ¹⁹ *NATO defence planning capability review 2023/2024: The Netherlands*, 2. The Dutch Navy and Air Force generally pass the review though not without a warning that staffing approaches critically low numbers.
- ²⁰ *NATO defence planning capability review*, 5.
- ²¹ *NATO defence planning capability review*, 36–37.
- ²² *2024 Defence White Paper*, 43.
- ²³ *Defence vision 2035*, 11.
- ²⁴ *Defence vision 2035*, 17.
- ²⁵ *Defence vision 2035*, 19.
- ²⁶ *Defence vision 2035*, 36.
- ²⁷ *Defence vision 2035*, 37.
- ²⁸ A definition like this is touched upon in a podcast by the head of the so-called Transition Team whose task it is to prepare the Dutch military for a scalable organisation. “Tonny van den Belt, Transitieteam CDS, verzekerde zijn dochter dat de Russische troepenbewegingen aan de Oekraïense grens slechts machtsvertoon waren. Toch realiseerde hij zich later dat de situatie ernstiger was.” *Samen Sterker Podcast Defensie*, Ministerie van Defensie, 18 januari 2024. Relevant part at 24:12.
- ²⁹ See e.g., Lund and Nielsen, “The concept of business model scalability”, 1–18; Stampfl, Prügl and Osterloh, “An explorative model of business model scalability”, 226–248.
- ³⁰ Coviello et al., “Organizational scaling, scalability, and scale-up”, 1–27.
- ³¹ With exercises I specifically mean walkthrough scenarios to experience how all elements come together.
- ³² Greiner, “Evolution and revolution as organizations grow”, 37–45.
- ³³ For these methods, I have made profitable use of Galvin, *National preparedness and military readiness*, 91–105.
- ³⁴ Galvin, *National preparedness and military readiness*, 100–101.
- ³⁵ Galvin, *National preparedness and military readiness*, 105.
- ³⁶ Klimas et al., *Assessing the army’s active-reserve component force mix*.
- ³⁷ Trevithick, “Russia to ‘modernize’ 800 vintage T-62 tanks due to Ukraine losses”; Mizokami, “Russia Is fielding 50-year-old tanks in Ukraine, which is ... not a great strategy”.
- ³⁸ *2024 Defence White Paper*, 7.
- ³⁹ “De maatschappij moet zelfstandig kunnen functioneren, als de krijgsmacht aan de oostgrens bezig is het gevecht te winnen.” Chief of Defense Gen. Eichelsheim, “Toespraak Commandant der Strijdkrachten Generaal Eichelsheim bij perspresentatie Defensienota 2024”, 5 September 2024, available at <https://www.rijksoverheid.nl/documenten/toespraken/2024/09/05/toespraak-commandant-der-strijdkrachten-generaal-onno-eichelsheim-bij-perspresentatie-defensienota-2024-op-5-september>
- ⁴⁰ In the current time frame, full scale war is a complicated issue to prepare for properly, as it is warped and overshadowed by the even more impactful nuclear war power balance. Here we nonetheless forego the nuclear dimension and focus on the trajectory before it.
- ⁴¹ Monin, “Ukraine’s projected 2025 budget expects the war to continue”.
- ⁴² “Ukraine support tracker”.
- ⁴³ “Ukraine fact sheet”.

- ⁴⁴ North Atlantic Council, *Commitment to enhance resilience*, NATO, “Resilience, civil preparedness and Article 3”.
- ⁴⁵ Cf. Betts, who notes that the good coordination and phasing of the redirection of resources towards the military-industrial complex is what can mitigate the inefficiencies of rapid conversion; Betts, *Military readiness*, 212–213.
- ⁴⁶ As well as other issues such as climate change, terrorism, the cyber domain, and hybrid warfare. North Atlantic Council, *Brussels Summit Communiqué*.
- ⁴⁷ Malkasian, *A history of modern wars of attrition*; Nolan, *The allure of battle*.
- ⁴⁸ “Explainer on Russian conscription, reserve, and mobilization”.
- ⁴⁹ Ministry of Defence, “Aantallen personeel”.
- ⁵⁰ “Explainer: What does Russia’s ‘partial mobilization’ mean?”.
- ⁵¹ USSR 7%, USA and Japan 8%, UK and Italy 10%, Germany 13%. Cf. Harrison (ed.), *The economics of World War II*, 14.
- ⁵² World Bank, “Armed forces personnel, total – Ukraine”.
- ⁵³ *Helsinki Times*, “Finland to raise wartime strength to 280,000 troops”.
- ⁵⁴ The Finnish Defence Forces, “Conscription – a Finnish choice”.
- ⁵⁵ Rijksoverheid, “Wat is het Dienstjaar Defensie?”
- ⁵⁶ Park and J.A. Nagl, “Was 50 years long enough? The all-volunteer force in an era of large-scale combat operations”, 40–46.

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Scalable preparedness: Healthcare initiatives for resilient wartime response

Willem Goes, René Janssen, and Alexander van Oers

Abstract

Because of the Russian invasion of Ukraine and the rising tensions worldwide, the Netherlands armed forces and its NATO allies are preparing for a war of necessity. The 2024 Defence White Paper, *Strong, Smart and Together*, emphasises the importance of strengthening operational support. Given the limited time available for scaling up, we argue that efforts should go beyond merely expanding resources and should instead focus on rethinking the preparation of the operational military healthcare system. Drawing on lessons from the Cold War and the war in Ukraine, we propose three key measures to enhance the Dutch military healthcare system: large-scale medical evacuation by train, strengthened civilian-military cooperation through societal resilience, and improved training for military medical personnel.

Keywords: Medical chain; Ukraine; Russian invasion; Medical education

Introduction

Because of the Russian invasion of Ukraine in 2022 and the rising tensions worldwide, the Netherlands armed forces and its NATO allies are preparing for a war of necessity. In such a war, a huge number of wounded soldiers are to be expected. Indeed, the number of casualties in the Russian invasion has not been seen in Europe since the Second World War.

Within the Netherlands Defence Organisation, the 2024 Defence White Paper, *Strong, Smart and Together*¹ highlights the need for strengthening operational support: “Substantial investments will be made in the medical chain regarding operational deployment, including in appropriate supplies, medical treatment capacity and medical personnel. The medical chain encompasses the treatment and care of casualties and their transport and evacuation from the area of operations to the Netherlands. These investments will enable Defence to comply with NATO standards and operational plans.” The memorandum explicitly mentions cooperation with civilian partners and society as crucial elements of military preparedness, particularly in areas such as military mobility, transport, and medical healthcare.

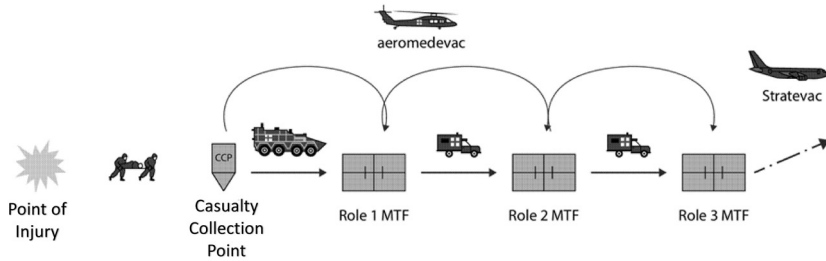
This chapter addresses the following central question: **How can the Dutch military healthcare system effectively scale up to prepare for a large-scale conflict with high casualty numbers?**

To answer this question, we analyse the quantitative challenges of building a scalable military healthcare system, with a particular focus on the recruitment, training, and deployment of medical personnel. A shortage of highly trained personnel is a critical bottleneck in any scalable healthcare system. We quantify the capabilities required for the Dutch medical chain in a military conflict with a high number of casualties. We examine how past approaches to military medical support, both during the Cold War and in recent expeditionary missions, have shaped the current system. Drawing on lessons from the Cold War and recent experiences in Ukraine, we propose three key strategies to enhance the resilience of the Dutch medical chain:

1. **Establishing large-scale medical evacuation capacity by train** to facilitate mass casualty transport.
2. **Strengthening civilian-military cooperation** through mandatory trauma life support training for medical professionals.
3. **Improving the recruitment, training, and retention** of military medical personnel.

Required capabilities of the Dutch medical chain

The basic form of the operational healthcare system is the so-called linear evacuation system, in which care is provided in successive roles (see Figure 9.1). An injured person receives advanced first aid by a combat lifesaver at the Point of Injury and Prehospital Emergency Care by medical personnel at the Casualty Collection Point. Then he is transported as quickly as possible, preferably directly, to the most appropriate Medical Treatment Facility (MTF). MTFs are medical facilities where casualties are received, stabilised, treated, and prepared for transport. Each role MTF has defined capabilities. At a Role 1 MTF, treatment by medical professionals begins, at the level of advanced resuscitation. At a Role 2 MTF, operation rooms are available, where surgical intervention is possible. At a Role 3 MTF, even more specialised care is provided. Currently, the Netherlands does not have the capability to operate a Role 3 MTF on their own.²

Figure 9.1: Simplified schedule of the operational healthcare system.³

During a war of choice, the system is focussed on high quality of care, which is time consuming. During a war of necessity, the system can shift to evacuation-oriented operations, where necessary treatments to save lives are performed sequentially at various MTFs. The operational context and circumstances may result in a shortage of resources to provide high quality of care. Even after the combat action has ended, the peak moments for the operational healthcare system do not necessarily subside. The system remains under strain, which may result in a significant delay before all casualties have received their initial treatment. The focus is not on providing the maximum care for each individual but on delivering the best achievable care for the largest group of casualties ('do the most for the most').⁴

To investigate the required capabilities of the medical chain, we performed a simulation study with a Monte Carlo method using the software package Enterprise Dynamics.⁵ This is an object-oriented simulation platform combined with an event-oriented approach.⁶ Supply chain management, healthcare,⁷ and logistics & distribution are areas where Enterprise Dynamics is applied.

We were particularly interested in the amount of operation rooms (present in a Role 2 MTF) required. We modelled the following situation: a brigade of 4,500 soldiers is involved in a conflict situation, in the highest spectrum of conflict, for 10 days. Soldiers are injured, with seriously injured soldiers requiring treatment (at least) at a Role 2 MTF. Based on the quality requirement that seriously injured soldiers must enter an operating room within one hour,⁸ the question was how many operating rooms are at least necessary to guarantee with a probability of more than 80% that at least 75% of all seriously injured people in these 10 days of the conflict will arrive within 60 minutes into an operating room of the Role 2 MTF after injury. These requirements are our quantification of the principle 'do the most for the most'.

We used the data from Goes (2018)⁹ who used the Ace Directive 85-8 as calculation model. These are the most important assumptions to gain a quantitative insight: (1) 217 soldiers are injured per day; (2) the probability that a wounded soldier will be seriously injured is $2/3$; (3) all wounded arrive at a Role 1 MTF and are ready to leave this unit within 15 minutes; (4) only seriously injured soldiers go in an ambulance to a Role 2 MTF, where one or more operating rooms are present; (5) in an operating room, one injured person is treated and an operation takes four hours; (6) if a seriously injured soldier enters an operating room of the Role 2 MTF within 45 minutes after entering the Role 1 MTF, we call it a success.

Our simulation study showed that 26 operating rooms are required. For a lower number of operating rooms, the wounded soldiers would have to wait (in line) for an operating room to become available. The waiting time quickly increases with a decreasing number of operating rooms. The required number of operating rooms is much higher than the Dutch military healthcare can provide.

In the Netherlands, a hospital company consists of 1 Role 2 MTF Enhanced and 2 Role 2 MTFs Basic. A Role 2 MTF Enhanced has 2 operating rooms and a Role 2 MTF Basic has 1 operating room. The difference between an Enhanced and Basic Role 2 MTF is not only the capacity; more specialised care can be provided to the wounded in a Role 2 MTF Enhanced.¹⁰ Each hospital company has 4 operating rooms in total. The 400 Medical Battalion has (at best) 4 hospital companies, for a total of 16 operating rooms. This is much less than the required 26 needed to support one brigade of 4,500 soldiers during 10 days in heavy conflict.

Similar findings have been reported.¹¹ The operational healthcare system, in its current form, is unable to evacuate the expected number of casualties and provide adequate medical care during a large-scale conflict. The necessary capabilities for this are either available in insufficient quantities or not available at all. Two of the identified bottlenecks were:¹² there is insufficient operation room /treatment capacity for a war of necessity and the personnel staffing of the medical units is particularly low for Role 2 capacity (50%).

There is a shortage of hospital companies. It is not only a shortage of operating room equipment but also a shortage of highly educated military medical personnel that requires attention since in each of the Role 2 MTFs of a hospital company there are usually between 3 and 10 physicians on site, depending on the size of the facility and the specific medical staff required for the surgeries and care provided. The procurement of operating room equipment can be achieved in the foreseeable future, but it is not possible to train enough high-quality military medical personnel in such a short period of time.

The Dutch view on military medical support during the Cold War and recent expeditionary missions

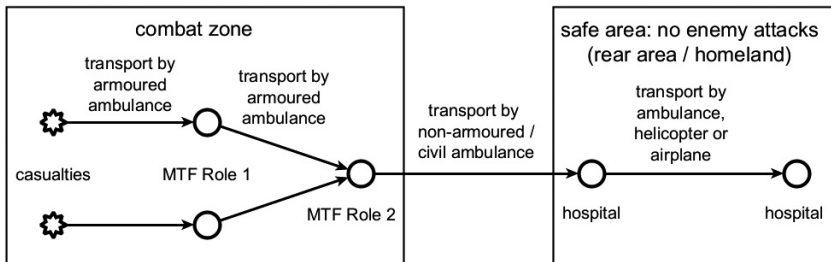
At the end of the Cold War at the end of the 1990s, the Netherlands Defence Organisation underwent a major transition. After a decades-long focus on defending Allied territory during the Cold War, the actions of the Dutch Defence increasingly took on the character of an expeditionary armed force with new tasks in an unstable world. The Netherlands Defence Organization became smaller, partly because of the suspension of compulsory attendance for military service in 1996, and nowadays consists of a professional army. The 1991 Defence Memorandum¹³ states that quality is more important than quantity when restructuring the armed forces. The 1991 Defence Memorandum¹⁴ also states that the requirements imposed on the restructured armed forces will also lead to new requirements for military health care. Inevitably, the transformation of the Netherlands armed forces also had consequences for military healthcare. The 1992 priority memorandum¹⁵ concludes that the reduction of the armed forces will logically lead to a smaller patient base for the military healthcare system, but also that expeditionary deployment of the armed forces in humanitarian and peace operations leads to a greater need for military medical personnel who can be deployed quickly and immediately with a broad degree of military medical knowledge. The new task of the early 1990s, in which quality takes precedence over quantity, not only has consequences for how military healthcare is organised but also for the training of military medical personnel and the staffing of the military medical organisation.

This quality thinking is concretely expressed, for example, in the basic principles and system requirements for military health care, which, after revisions in 1990 and 2002, indicate in the 2007 version¹⁶ that health care for the armed forces focuses on the quality standards customary in Dutch civil society, Dutch legislation and the Dutch professional standard. The military designation for the military healthcare system adopted in 2021, the successor to the 2007 basic document, also confirms the qualitative anchoring of military healthcare to the civilian quality standards applicable in the Netherlands by paying ample attention to the applicability of national healthcare legislation within the military healthcare system. The military healthcare vision 2015¹⁷ explains what this has meant in concrete terms in the operational context of the expeditionary Netherlands armed forces: the nature of missions in which the Netherlands armed forces participate is changing. There is an increase in complex missions at greater distances from the Netherlands, which are carried out under varying conditions of violence.

The design of the medical chain during expeditionary operations assumes a continuously high quality of care provided from the moment of injury up to and including final treatment and rehabilitation in the Netherlands. During treatment

in the chain, sufficient and qualified medical staff are assumed. Experiences from missions such as Afghanistan, Iraq and certainly Mali show that scarce, expensive and time-consuming resources for Aero-medical Evacuation (AE) are necessary to meet the imposed quality requirements. Figures 9.1 and 9.2 show an expeditionary mission where Aero-medical Evacuation (AE) by helicopter provides high-quality medical care. According to Kress (2016)¹⁸ the two principles on which medical support during an operation are based are (1) damage control and immediate first aid for injured casualties on the battlefield and (2) fast evacuation of injured casualties from the battlefield to a hospital where definitive medical care is available. Medical services deal with relatively small numbers of injured casualties. Risk management determines the method of transport for injured casualties. Because of the small number of wounded, a helicopter can be a very efficient way of dealing with injured casualties since the number of medical treatment facilities near the combat zone can be reduced by quick air evacuation.

Figure 9.2: Medical chain for an expeditionary mission



A Patient Evacuation Coordination Cell (PECC) coordinates the patient flow during missions at Brigade/Task Force level. The PECC coordinates, directs and records qualitatively and quantitatively every individual patient movement within the operating area.¹⁹ This leads to a high-quality system of operational military healthcare, but also to a lot of coordination and management. Because it has now been 35 years since the end of the Cold War, the current generation of military healthcare providers is used to working in a relatively small Defence organisation where the quality of care provided meets the quality standards applicable in the Netherlands. Since the military healthcare providers care for a relatively small group of injured people, they can provide high-quality care with numerous healthcare providers available.

How different this was during the Cold War. Just after the Second World War (WWII), when the first signs of it appeared, experts indicated it would once again have a total character, similar to WWII. The new conflict would not revolve around eliminating enemy forces but would focus on undermining the “popular strength and morale of the people”.²⁰ Fuelled by the experiences of WWII, in which images of seriously injured soldiers waiting for removal or treatment were seared into the minds of many, the conclusion was already drawn in 1949 that real war preparation can only be achieved if all military and civilian authorities cooperate fully.²¹ Ultimately, the Council of Ministers deemed this so serious that they established the Medical Defence Council (GVR) on July 16, 1951.²² This council’s goal was to advise and coordinate national war preparations between military and civilian partners. The military medical service could not do without civilian hospitals in times of war, despite uncertainty about the question of who, for example, should bear the costs for medical facilities in wartime (is that a cost item for public health or the armed forces since most casualties will be on the military side?). In 1954, the GVR reached an agreement with various civilian hospitals that, in times of war, 8,365 beds were to be made available in civilian hospitals to supplement its military hospital capacity.²³ It was taken for granted that these agreements, although well covered on paper, would probably prove difficult to implement in practice. The main reason given for this was a shortage of properly qualified and available personnel.

Although cooperation between military and civilian health care providers and hospitals was explicitly expected to be necessary for the more definitive and longer-term care of war victims, this was not the case for care at the front. The primary task of the Military Medical Services became the reception and treatment of large numbers of victims who fell in direct contact with the enemy at the front.²⁴ The enormous effort that the civil and military medical services have to make to accommodate, move and treat military victims, possibly also in combination with civilian casualties as a result of war violence, places an enormous burden on the healthcare system. Figure 9.3 shows the interior of the ambulance train in the context of the exercise ‘Combi Care’ (May 1987) as an example of moving military victims. If we realise that the “entrance” to that full system, according to the MGD committee, is mainly the responsibility of the military medical services, properly qualified military healthcare providers must be ready on a large scale.

Figure 9.3: Transport of wounded people by ambulance train from Verden (West Germany) to Roosendaal during the exercise ‘Combi Care’ (May 1987). Interior of the ambulance train.²⁵



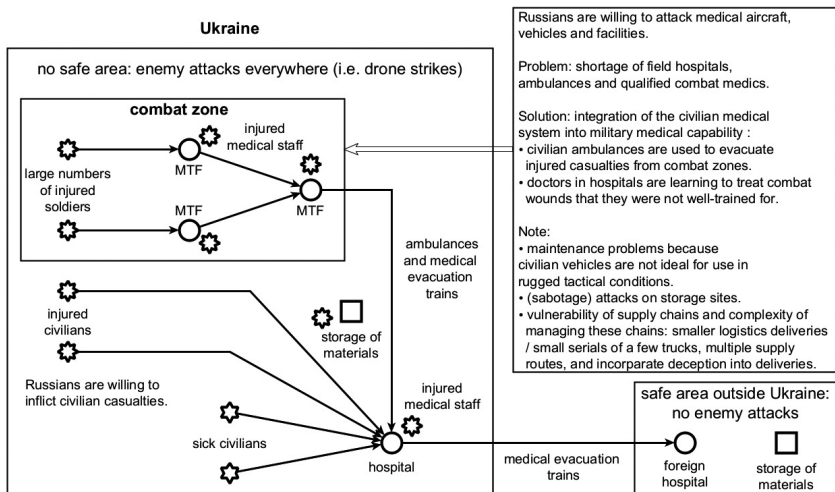
During the Cold War, several challenges had already been identified in the field of scalability of both the civilian and military medical systems. An important bottleneck is the organisation of medical care, which was not yet considered at the time: the instruction and training required to operationalise the healthcare system in war conditions.²⁶

Ukraine since February 2022

In this section, we concentrate on the lessons learned from the situation in Ukraine. Today in Ukraine the “battlefield” or unsafe area is not limited to a geographic region, like the eastern part of Ukraine. There is no clear separation

between the combat zone, where soldiers are fighting each other with large numbers of injured soldiers on both sides, and a safe area, where civilians are safe.²⁷ The Russians treat the entirety of Ukraine as the battlefield. You cannot say that a person or vehicle is safe in a limited area. Both soldiers and civilians can be the victim of enemy attacks by Russians. The same goes for military and civilian vehicles and warehouses. Figure 9.4 shows the current view of the medical chain in Ukraine.²⁸

Figure 9.4: Challenges in the Ukrainian medical chain



The permanent threat of enemy fire makes risk management critically important to logistics planning and operations. Since there is no safe area within Ukraine, logistics deliveries are smaller and use multiple routes, which is less efficient but more effective.

Since the Russians are willing to attack medical aircraft, vehicles and facilities, the Ukrainians are facing a shortage of field hospitals, ambulances and qualified combat medics. Any (qualified) medical personnel that is injured or killed increases the already existing shortage. To expand the military medical capability, the civilian medical system was integrated into the military system. This was confirmed during a COMEDS (Committee of the Chiefs of Military Medical Services in NATO) plenary in 2023.²⁹ Civilian ambulances are used to evacuate injured casualties from combat zones and civilian doctors in hospitals are learning to treat combat wounds they were not well-trained for. Even though the conflict is on-going, there is still much to be done in elementary training by, for example, the EU Military Assistance Mission (EUMAM) in support of Ukraine.³⁰

A special issue in the war in Ukraine is the deployment of medical evacuation trains or ambulance trains. Ambulance trains were first used during the Crimean War in the 1850s. During World War I ambulance trains were frequently used for evacuating huge numbers of casualties from the trenches at the front lines. This is a situation that is to a certain extent comparable to the current situation in Ukraine.

The news channel CNN got a glimpse into a medical evacuation train used by the Ukrainian army to transport the wounded from the front lines to hospitals around Ukraine.^{31,32} These hospital trains are lifesavers, since long ambulance journeys for critically wounded patients are too dangerous from a medical point of view and evacuation by helicopter is almost impossible because of Russian attacks. These medical evacuation trains are crucial to deal with the constant stream of casualties from the front lines to hospitals. Some 90% of the patients have suffered multiple shrapnel injuries caused by, e.g., exploding grenades dropped by drones.^{33,34} See also Epstein (2023)³⁵ for more information about the injuries of wounded soldiers in the Ukrainian conflict. For the medical evacuation chain, it is important to mention that Russia not only attacks soldiers but also combat medics who work on the front and critical infrastructure like railway stations. The medical evacuation train is a major target for Russia, so the route of this train is confidential. The speed of the train is reduced to half the speed of a regular train to prevent too much “rocking and rumbling”. It has priority over all other trains.³⁶

In Walravens, et al. (2023)³⁷ more details are presented of medical evacuation by train in Ukraine, 2022. Over a period of eight months, two medical trains made 74 journeys, evacuating 2481 patients from 11 cities close to the frontline. Originally, these two trains were not medical evacuation trains. One train needed minimal adjustments and could be rapidly deployed to address the most pressing humanitarian needs, while the other train underwent major structural modifications to provide intensive care capacity. The first medical train consisted of 2 sleeper carriages with modified partitions to allow stretchers to enter, 1 sleeper carriage for ambulatory patients with less severe conditions, and 1 staff carriage. Up to 32 immobile patients and 27 ambulatory patients could be transferred. The second train consisted of 8 carriages: 1 carriage with 5 ICU beds, 2 carriages with 9 beds for non-ambulatory patients, 1 regular sleeper carriage, and 1 carriage with beds and mattresses for ambulatory patients with non-severe conditions and their companions. The 3 remaining carriages were for staff, medical stock, oxygen generators, and an uninterruptible power supply, which was needed to allow transport of ICU patients over long distances on an unreliable electrical railway grid.

These two medical evacuation trains are deployed within Ukraine itself and do not transfer patients abroad. As one of the lessons learned from Ukraine, Schmidt (2024)³⁸ emphasised the importance of large-capacity vehicles, like buses and hospital trains, in MEDEVAC for the Bundeswehr.

The situation in Ukraine shows that health care in war conditions is more than ever a whole-of-government responsibility. Russia does not attack a limited area of Ukraine. The Russians are willing to attack medical aircraft, vehicles and facilities. (Military) equipment can be replaced although this can be a tough job. (Military) medical personnel is a scarce resource that cannot simply be replaced.

Scaling up the Dutch medical chain

For a brigade of 4,500 soldiers engaged in high-intensity conflict, where injured personnel require treatment at a Role 2 Medical Treatment Facility (MTF) or higher, there is a significant shortage of both equipment and (military) medical personnel. With limited time to prepare for a large-scale military conflict that could result in numerous casualties, scaling up the Dutch medical chain is a pressing challenge. We propose three key measures to enhance medical capacity: (1) the deployment of medical evacuation trains, (2) strengthened civil-military cooperation, and (3) improving and maintaining the competence and readiness of (military) medical personnel.

1. Deployment of medical evacuation trains

A critical solution for mass casualty evacuation is the use of medical evacuation trains to transport wounded personnel to the Netherlands for advanced treatment. The concept is not new – a 1997 study by the Netherlands Army Medical Corps proposed an ambulance train system. Dutch Railways (NS) planned to allocate up to 11 trains, each configured with two locomotives, six carriages for 252 lying wounded, a treatment carriage, a care/kitchen carriage, a command/supply carriage, and a staff carriage.

For an evacuation from Vilnius (Lithuania) to Amsterdam/Utrecht (Netherlands), a regular train ride via Warsaw and Berlin takes 21 hours. Given that medical evacuation trains operate at half the speed of regular trains (similar to the current approach in Ukraine), the journey would extend to 42 hours. Factoring in loading and unloading times (6 hours), a single medical evacuation train could transport 252 wounded individuals every 96 hours – an average of 63 per day. Given that a Netherlands brigade of 4,500 soldiers could experience up to 217 Wounded in Action (WIA) daily (with 144 requiring surgery), at least two to three evacuation trains would be required.

Despite the potential benefits, the deployment of medical evacuation trains presents significant logistical challenges. The availability of railway infrastructure, prioritisation of track usage, and security concerns must be addressed.

Furthermore, operating these trains requires sufficient trained personnel and robust coordination with NATO allies to ensure efficient cross-border movements.

Moreover, the route of the medical evacuation trains must be safe. Guaranteeing safe routes is a challenge that can be approached mathematically. A direction for a solution can be found in Washburn (2018).³⁹ This paper is motivated by the military problem where one side plants mines on a network of roads while the other side clears them in an extended conflict.

2. Strengthening civil-military cooperation

To scale up medical capacity, civilian medical professionals should be better integrated into the military medical chain. We propose making two weeks of mandatory trauma life support training a standard part of all medical education programs, from nursing to medical school. This approach would create a broad pool of trained professionals capable of assisting the military medical chain when needed.

Ukraine's experience demonstrates that war affects the entire civilian population, making widespread emergency training crucial. According to the Red Cross and the Netherlands Institute for Public Safety (NIPV), only one in five Dutch citizens has ever taken a first aid course. Unlike their counterparts in Northern and Eastern Europe, Dutch civilians lack adequate training in emergency response. In a large-scale conflict, the burden on the military healthcare system will be overwhelming, making it crucial that civilians are equipped to provide immediate first aid and stabilise casualties before professional medical assistance becomes available. Strengthening civilian preparedness through widespread first aid training is therefore an essential component of a scalable and resilient medical response.

Military medical personnel are highly trained and specialised, but they cannot be relied upon for large-scale training during a conflict, as they will be deployed. Unlike the current war in Ukraine – where EU allies are training Ukrainian personnel⁴⁰ – in a major European conflict allied nations may be unable to provide training support due to their own commitments. Investing in civilian preparedness now is essential for avoiding a critical shortage of qualified medical personnel in wartime.

3. Improving training and competence of (military) medical personnel

Ensuring that military medical personnel maintain the highest levels of competence requires innovative training approaches. The Defence Healthcare Education and Training Center (DGOTC) has been testing scalable educational models for several years, with digitalisation and simulation playing an increasingly important role. The COVID-19 pandemic accelerated this transition, highlighting the potential of e-learning and blended learning approaches.

The DGOTC has been experimenting for several years with educational methods that should enable scalability of military medical training. Since 2020, the DGOTC has implemented educational innovations in various training courses with the aim of continuing to provide more scalable, yet high-quality training. In addition to experimenting with personnel scalability by, for example, working with a ‘flexible shell’ of external personnel, another didactic concept has also been applied. During that time, the DGOTC redesigned the Combat Life Saver (CLS) training course, moving away from the ‘classic’ educational model in which an instructor stands in front of the class and guides a group of students through the course material under central supervision. Instead the Vocational Training Courses, as a didactic concept, have been translated into a learning path in which individual customisation is the starting point as much as possible. This new training method leads to a reduction in training time of 25% (from 4 weeks to 3 weeks), whereby the Dutch Organisation for Applied Scientific Research (TNO) has found out that the quality of the output is at least equivalent. TNO has also found that the decline in the level of the acquired skills occurs less rapidly over time.⁴¹ This leads to the conclusion that, by organising and guiding education differently across the Defence sector, and perhaps also in a broader social context, a significant increase in scale can be achieved.

This research underscores the need for a fundamental shift in how medical training is structured. A scalable training system is essential not just within the Defence sector but also in a broader societal context, ensuring that a large pool of trained personnel is available when needed. The lessons of the Cold War remain relevant, but modern conflicts demand additional preparation, particularly in the training and education of personnel across the entire medical chain.

Discussion and managerial implications

Preparing for a large-scale military conflict requires a fundamental transformation of the Dutch military medical chain. The shortages of equipment and personnel demand immediate and innovative solutions to ensure that adequate medical care can be provided in high-intensity conflict scenarios. To effectively scale up the Dutch military healthcare system, a combination of logistical innovation, civil-military collaboration, and improved medical training is essential. By implementing medical evacuation trains, expanding civilian involvement through mandatory trauma life support training, and improving the recruitment and education of military medical personnel, the Netherlands can develop a more resilient and scalable medical system capable of responding to mass casualties in future conflicts.

Medical evacuation trains offer a practical method for transporting large numbers of wounded personnel safely, but their success hinges on pre-established

logistical planning, infrastructure security, and personnel training. Likewise, integrating trauma life support training into civilian medical education programs can significantly expand the available medical workforce, reducing reliance on highly specialised military personnel during wartime. Furthermore, leveraging digital learning and simulations for military medical training will ensure personnel maintain high levels of competence while allowing for a more scalable approach to education.

These efforts must be pursued proactively – waiting until a crisis emerges is not an option. The lessons from past conflicts, combined with modern innovations, provide a roadmap for enhancing medical preparedness. By investing in strategic solutions today, the Netherlands can safeguard the lives of its soldiers and civilians in future conflicts, ensuring that the medical chain remains operational even in the most challenging circumstances.

Notes

- ¹ Netherlands Ministry of Defence, 2024.
- ² Defensie Gezondheidszorg Opleidings- en Trainingscentrum, “Handboek Military Health Care (HB MHC)”.
- ³ Defensie Gezondheidszorg Opleidings- en Trainingscentrum, “Handboek Military Health Care (HB MHC)”.
- ⁴ Defensie Gezondheidszorg Opleidings- en Trainingscentrum, “Handboek Military Health Care (HB MHC)”.
- ⁵ Enterprise Dynamics from InControl: <https://www.incontrolsim.com>
- ⁶ From a library, the user can choose common simulation items (also known as “Atoms”) that capture the behaviour of their real-life counterparts. By clicking and dragging the objects into the model space, the user can create a model. The behaviour of each simulation item can be changed by adjusting its parameters.
- ⁷ Moons, et al., “Optimization of operations by simulation”.
- ⁸ Defensie Gezondheidszorg Opleidings- en Trainingscentrum, “Handboek Military Health Care (HB MHC)”.
- ⁹ Goes, “Geneeskundige ondersteuning van landoptreden bij een grootschalig conflict”.
- ¹⁰ Defensie Gezondheidszorg Opleidings- en Trainingscentrum, “Handboek Military Health Care (HB MHC)”.
- ¹¹ Koninklijke Landmacht 19 December 2024, 89.
- ¹² Koninklijke Landmacht 19 December 2024, 89.
- ¹³ Netherlands Ministry of Defence, 1991, 30.
- ¹⁴ Netherlands Ministry of Defence, 1991, 173.
- ¹⁵ Netherlands Ministry of Defence, 1992, 58.
- ¹⁶ Netherlands Ministry of Defence, 2007, 5.
- ¹⁷ HMA/kwartiermaker militaire gezondheidszorg, “Visie Militaire Gezondheidszorg”.
- ¹⁸ Kress, *Operational logistics*.
- ¹⁹ Goes, “Geneeskundige ondersteuning van landoptreden bij een grootschalig conflict”.

- ²⁰ NL-HaNA, “Rapport van de Werkcommissie”.
- ²¹ van der Vegt, “Hoofdstuk IV: Militair Geneeskundige Dienst.”
- ²² Duurland, *Asklepios en het zwaard*.
- ²³ Duurland, *Asklepios en het zwaard*.
- ²⁴ Netherlands Ministry of Defence, 1967.
- ²⁵ Image sourced by NIMH. Foto: H. Keeris.
- ²⁶ Duurland, *Asklepios en het zwaard*.
- ²⁷ Epstein et al., “Putting medical boots on the ground”.
- ²⁸ Russian war against Ukraine, lessons learned curriculum guide 2023.
- ²⁹ Schmidt, “Lessons learned from the war in Ukraine”.
- ³⁰ For EUMAM in support of Ukraine see https://www.eeas.europa.eu/eumam-ukraine_en?s=410260.
- ³¹ Amanpour, “On board a lifesaving hospital train”.
- ³² CNN, *These trains are a closely guarded military secret in Ukraine*.
- ³³ Amanpour, “On board a lifesaving hospital train”.
- ³⁴ CNN, *These trains are a closely guarded military secret in Ukraine*.
- ³⁵ Epstein et al., “Putting medical boots on the ground”.
- ³⁶ CNN, *These trains are a closely guarded military secret in Ukraine*.
- ³⁷ Walravens, et al., “Characteristics of medical evacuation by train in Ukraine”.
- ³⁸ Schmidt, “Lessons learned from the war in Ukraine”.
- ³⁹ Washburn, “Ratio game on a network”.
- ⁴⁰ EUMAM mission.
- ⁴¹ Landman, “Retention of military combat lifesaving skills”.

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The role of mission command in scaling up the armed forces

Kevin van Loon and Stefan Mastenbroek

Abstract

This chapter focuses on the role of mission command in designing, implementing and activating Dutch scalable armed forces. It provides an overview of the development of mission command in general and its current application in 21st century warfare, followed by Dutch mission command applications. It concludes that mission command can increase operational and peacetime effectiveness *if* each department in the Dutch armed forces formulates what mission command implies for them concretely (both operational commands and civil service), and what kind of leadership and followership it requires. The main effort therefore should be building trust in teams and training and education (skills, processes & mission command); specifically, training the process of upscaling in all its facets. A specific point of attention is mission command between teams: creating a multi-team mission command system (a peer network of commanders).

Keywords: Mission Command; Military Leadership; Scalability; Operational Effectiveness

Introduction

According to the Dutch MoD, geopolitical developments require the establishment of scalable armed forces.¹ The concept of scalable armed forces has been formally defined and shared with the Dutch Parliament in the policy document “A Service Model for a Scalable Armed Forces” on June 3, 2024.²

This definition encompasses the core elements of scalability within the military:

*Scalable armed forces refers to a military organisation capable of **rapidly and effectively mobilising capacities** (personnel, equipment, infrastructure, knowledge, etc.) from within the organisation and society at large. Such scalability includes both upscaling (quantitative and qualitative expansion) and downscaling (reduction) **to adapt** to the current threat level. A scalable armed forces must rely on multiple societal domains (e.g., material resources, real estate, space, services, healthcare) **to ensure readiness and adaptability**.³*

Since October 2023 the transition team of the NLD Chief of Defence Staff (CHOD) has been tasked with the design, implementation and coordination of scalability across the defence organisation. Their analysis of the defence organisation and its current context highlighted several deficiencies in capacity, particularly in terms of *endurance, regeneration, and sustainment*. Moreover, it stressed the importance of transitioning from a culture and structure designed for peacekeeping and peace support operations, to one primarily focused on large scale (conventional) combat operations: *a culture and structure of readiness*.

Based on the definition of scalability in the military and their analysis,⁴ the transition team developed an action plan (“*Action Plan for a Scalable Armed Forces*”)⁵ with eight organisational principles that serve as the foundation for the transition: (1) international and national requirements, (2) resilience (both societal resilience and military readiness),⁶ (3) standardisation of procedures, processes, and (weapon) systems, (4) personnel, (5) material and logistics, (6) critical business processes, (7) risk acceptance and management, and (8) mission command.⁷

All principles are essential for the transition, but the analysis highlighted *mission command* as an important prerequisite. It is seen as a way of thinking and acting that enables the armed forces to operate more effectively and respond more swiftly (including scaling in size) in an increasingly complex and rapidly changing battlefield. Mission command can therefore be seen as a critical enabler to effectively achieve scalable armed forces and as such it is the central theme of this chapter.

The action plan for scalable armed forces describes mission command as follows:

*In mission command, the establishment and communication of the commander’s intent is central, giving maximum freedom of action to the lower executive levels. The intent focuses on the context in which the mission is to be performed and on the results and effects to be achieved, rather than on how they are to be achieved. The authority for execution is thus decentralised.*⁸

This description is based on the NATO definition in the Allied Joint Publication 01 (AJP 01). This chapter uses that definition set by NATO, because NATO doctrine is foundational for all member states. The AJP 01 has been recently revised and the current description reads as follows:

Mission command is NATO’s command philosophy, it shapes the command styles, attitudes and behaviours of commanders and subordinates. It is based on empowered leadership, which enables decisions to be made by those best placed to make them, exploiting opportunities that emerge from competition. Mission command offers a significant advantage

*when applied correctly, enabling the joint force to overcome a rival in the most chaotic and demanding circumstances by maximizing initiative to seize opportunities.*⁹

The AJP 01 further explains that mission command is based on two fundamental elements: (1) trust and (2) mutual understanding, and three principles: (1) unity of (outcome &) effort, (2) timely and effective decision-making and (3) decentralised execution. At its core, the idea is that regardless of the situation or position and amount or lack of communication capabilities, commanders in combat respond quickly to opportunities or threats. Because they can align with higher-level objectives – enabled by a clear intent, trust and mutual understanding – they are faster and more effective than the opponent.¹⁰

Operating under the thesis that mission command is critical to achieving the momentum and agility necessary for scaling up the armed forces, and that establishing a common language and shared conceptual framework is essential during any transition, this chapter aims to answer the following central question: *how can mission command contribute to the development and implementation of scalability in the Dutch armed forces?*

To provide a thorough answer to this question, it is necessary to outline the origins and fundamental components of mission command first. After a short methodology description, the first part of this chapter therefore provides a description of the development of mission command in several nations which have contributed greatly to the concept. This part ends with the role of mission command in the 21st century, specifically based on lessons from the Ukraine war. The second part of this chapter focusses on the contemporary perspective on mission command within the Dutch Ministry of Defence. Thereafter, the third part explores the significance of mission command in the Dutch transition towards scalability. The conclusion and discussion provide an answer to the central question and actionable recommendations for the implementation of mission command in the Dutch armed forces context.

Methodology

This chapter is based on extensive desk research. A selection of scientific literature covering the development and current perspectives on mission command was analysed, including mission command in the Ukraine war. Also various doctrine publications¹¹ were compared and analysed. Furthermore, the responses of 31 Dutch army officers on four questions regarding *command climate* were analysed. Their responses revealed valuable insights regarding important elements of mission command, such as *trust* and *providing a clear intent*. In addition, observations and data gathered over time by the transition team were available upon request. These

included the analysis of 40 interviews with key stakeholders ranging from the commander of the Netherlands Army and Navy to the director of operational readiness (DAOG) and senior policy makers. Furthermore, the authors gained insights from the recent development of a mission command workshop by the Expertise Centre for Leadership Defence (ECLD) and a mission command conference hosted by the UK Centre for Army Leadership (CAL).¹²

The origin and current role of mission command

Mission command is widely used, especially within the operational domain, but its interpretation and application vary. Common associations with mission command are: *distributed command and control*, *disciplined disobedience*, *delegated authority*, *disciplined initiative*, *empowered subordinates* and *decentralised decision-making*.¹³ Due to the urgency and necessity of being able to conduct large-scale combat operations, this difference in perception is reinforced and the debate of the role and way of executing mission command has flared up. It is therefore necessary to first provide a description of the development of mission command in history and its application in the 21st century.

Origin

The origins of mission command lie with the Prussian-German army. The industrial revolution increased the scale and intensity of combat. The battlefield and operational tempo could no longer be overseen by one commander. Units had to remain effective without having the possibility to communicate.¹⁴ This required a change to the command system towards a decentralised one, a revolutionary change in military affairs.¹⁵

After that, mission command developed during World War I (Von Hutier's stormtroop tactics), and in the run-up to the Second World War *Auftragstaktik* appeared (only ordering the 'what'); a way of command that was at odds with the earlier *Befehlstaktik* (ordering the 'what' and the 'how').¹⁶ This *Auftragstaktik* was combined with manoeuvre warfare (*blitzkrieg*).¹⁷ Providing clear orders with a recognisable style and structure and with a clearly formulated intent was crucial in this way of command. It should enable sub-commanders to take control of an emerging situation on their own: *independent initiative*. This required doctrine, professionalism, knowledge and training. Education and training in an environment where mistakes are allowed was therefore crucial.¹⁸ These developments were visible within each operational domain (sea, land, and air).

The US, the U.K., and Israel reinvented mission command as ‘*best practice*’ from the late 1970s and 1980s. At the time, it was linked to the Air-Land Battle doctrine in response to the Soviet threat.¹⁹ Based on geopolitics, new conflicts, new technology, new organisations and new mission objectives, mission command has since been further fleshed out within NATO. It became prevalent for commanders in the sea, land and air domain to issue orders with only *the why* and *the what* and not *the how*. After the Cold War era (90s and 00s), mission command developed further within the context of peacekeeping and stabilisation operations, counter-terrorism and the so-called ‘*wars of choice*.’²⁰

Since the war in Ukraine however, the focus is again on large-scale combat, including new domains: cyber and space. This renewed focus on largescale combat operations, on increasingly complex, technological, but transparent battlefields, affects the current role of mission command. It is therefore necessary to analyse its current role.

Mission command in the 21st century

NATO’s description of mission command does not sufficiently take into account three important developments in warfare that have revealed themselves particularly since the beginning of the 21st century and, in particular, the war in Ukraine: (1) complexity and interdependence in peer-networks of commanders, (2) the perspective of a philosophy or command structure and (3) the importance of competent leaders and team members (staff).

(1) MUTUAL DEPENDENCE ON AN INCREASINGLY COMPLEX BATTLEFIELD

The most recent literature points to a clear difference in mission command today compared to its origins of *Auftragstaktik*. King writes in 2017 about ‘*mission command 2.0*,’ in which the similarity lies in taking the initiative within the commander’s intent. The difference however, is the dependency. The independence to make decisions that was important in *Auftragstaktik* has been replaced in the last 15 years by (inter)dependence within a network of commanders. Information sharing and *shared situational understanding* are central because, unlike in the 19th century, today’s battlefield consists of many more effectors with mutual dependency relationships.²¹ Current coalitions and battlefield operations resemble *multi-team systems* which are much harder to effectively organise and connect.²² Essential conditions for effective mission command are therefore education, shared conceptual thinking and clear concepts enshrined in doctrines, the importance of the collective and ‘*shared consciousness*.’ This requires additional discipline to inform,

understand and contradict each other when necessary, without controlling, micro-managing or putting one's own interests first.²³

In addition to geopolitical, organisational and social developments, technological developments of recent years have had a major impact on war and hence the development of mission command.

Notable developments are:

- the increased complexity due to a greater span of control and operational depth, requiring more decisions to be made;²⁴
- the human factor in complex combat situations (physical, mental and cognitive resilience);²⁵
- the influence of technology and AI, including a transparent battlefield, open source intelligence and disinformation campaigns;²⁶
- the influence of technology enabling monitoring down to *'the single soldier.'* This increases the temptation to micromanage;²⁷
- the influence of strategic interests and organisational structure and culture, means mission command is carried out in a specific and *'proprietary'* way;^{28,29}
- the vanished (or limited) strategic personnel reserve, including the degree of training and equipment.³⁰

Some specific examples derived from the war in Ukraine include the deployment of unmanned systems (UAVs, USVs), and the use of satellite imagery and networks, sensor-based technology, smartphones, commercial data links and open-source intelligence. Combined with AI, these systems are accelerating the pace of modern war.³¹ There is also an increased impact of the use of private military companies and a greater emphasis on transnational commercial companies³² partnering in the private-public sector.^{33,34} The importance of deception and the use of unclassified intelligence has also increased^{35,36} and efforts are being made to integrate effects from all domains: Multi-Domain Operations (MDO).³⁷ All these specific developments have impact on effective mission command: for example, how to include drones and automated systems. And how to integrate private military companies and civilian logistical companies which contribute to sustainment operations.

In short, the complexity of today's battlefield has led to an increased dependence, a higher operational tempo and more depth, with the number and type of decisions being much higher. This means that mission command has become a shared responsibility, in which mutual trust, shared understanding and competent team members are essential.

(2) PHILOSOPHY OR COMMAND SYSTEM?

A lot of literature and doctrine documents refer to mission command as a philosophy. The NATO definition also describes mission command as their philosophy, but is mission command actually a philosophy?

Hill and Niemi write in their article – *The Trouble with Mission Command*³⁸ – that there is a risk that within NATO, mission command is labelled as a philosophy, while in many cases it is not lived or implemented that way. They point to the fact that mission command often seems to be an end in itself. Everyone should know how to act and is given freedom of action (autonomy), but this often does not work or backfires. Hill and Niemi and also Rose³⁹ therefore argue that mission command is not a philosophy but one of several command systems to choose from, which can certainly work well, but has now become too much of a guiding principle, with the danger of overestimation. This warning is reinforced by the existence of various (inter)national translations and interpretations of mission command, even within armed forces. Also the war in Ukraine showed that mission command is only partly effective on the Ukrainian side, among other reasons, due to a persistent centralised hierarchical culture stemming from the Soviet-era.⁴⁰

(3) IMPORTANCE OF COMPETENT TEAM MEMBERS

Competence is essential for successful mission command. In fact, all current academic research articles and doctrine documents⁴¹ indicate (in)directly that team members, and certainly also commanders, must understand and master their profession to do mission command justice. This means that commanders and team members must have knowledge of doctrine, tactics and weapon systems, in addition to knowledge of decision-making processes, the organisational structure and culture, and the geopolitical context of a specific deployment.

The current context of war demands more than before. Not just the individual parts, but precisely good knowledge – and the common picture – of the relation between the various (hybrid) effectors, time-space factors, battlefield transparency and technology is important. This affects the importance of education and training in an environment where mistakes can be made.⁴² Projecting the lesson of education and training on the conclusion that mission command is affected by 21st century warfare characteristics and can be either seen as a philosophy or a command system, means that a lot of effort should be put in both education and training. In teaching mission command itself, its conditions, strengths, but also limitations, and supporting leadership styles and decision-making models, in addition to extensive teaching and training in doctrine, tactics and integrated operations in today's complex battlefield are needed.

In a broader context, the need of education and training can be transposed to all defence management processes that guarantee operational readiness and capabilities to sustain operations. Again, competence of staff and 'management' is essential: every staff member must have sufficient knowledge of how mission command works and they must also be specialists in their field and be given sufficient autonomy and resources to take up their role. And, they must be supported by their managers and supervisors. As a result, competent leadership (military and civilian) is key on all levels. The leadership needs to put trust in their personnel and encourage ownership. Leadership should create the climate to ask questions and allow for taking calculated risks. More importantly, it also means they should not micromanage their staff. The fact that information is available 24/7 does not mean that one has to do something with it; mutual trust is the foundation for this. That trust arises mainly through shared experiences and literally learning to trust each other's knowledge and skills (competence).

The Dutch armed forces and mission command

After having provided a generic overview of the origin of mission command and its role in the 21st century battlefield context, attention is turned to the current Dutch perspective on mission command. This section shows that there is inconsistency in the way mission command is perceived and explained within the Dutch armed forces.

Formally, the Dutch armed forces work with NATO doctrine, unless specialisation or addition is needed. The Dutch Joint Doctrine Publication 5 – *command and control* – describes mission command, but is outdated and has not yet been replaced. The Dutch Defence Doctrine (NDD)⁴³ is recently rewritten and therefore a more reliable source to gain a clear understanding of the current Dutch perception of mission command. The new version describes mission command as follows:

In the Dutch armed forces, mission command is the guiding command philosophy. Central to mission command is establishing and clearly communicating the commander's intent (intent). This gives maximum freedom of action to the lower executive levels. The intent focuses on the results and effects of the mission to be achieved and on the context in which the mission is to be carried out, rather than on how they are to be achieved. Authority for execution is thus decentralised. That is, authority is delegated to the lowest level appropriate for the most effective and efficient use of resources and capacities.⁴⁴

Although this Dutch definition assumes mission command to be a command philosophy, the doctrine does not further explain what this exactly means and

what its implications might be. It does refer to the NATO AJP-01 for more in depth explanation, but the AJP-01 is too general to draw implications for the Dutch armed forces context.

In contrast to this NDD description, the Expertise Centre for Leadership Defence (ECLD) meanwhile applies the same seven principles as articulated in the U.S. ADP 6-0.⁴⁵ The ECLD tries to transpose how mission command works within the Dutch armed forces and has developed workshops for that purpose.⁴⁶ The latest initiative stems from a request from the Secretary General (SG) of Defence to the ECLD and was further developed in consultation with, among others, the transition team. It can be seen as a tangible application of the scalability action plan, intended to create an organisation-wide foundation for effective mission command.

Mission command has additionally been further explained as one of the SG's scalability priorities. Here, it was described as follows:

developing and applying mission as a command philosophy at strategic, operational and tactical levels. The philosophy should be made applicable for operations and decision-making. Here, risk acceptance, responsibility and ownership at the lower levels of the organisation are necessary preconditions. This requires an adjustment of the organisational culture in both policy and execution to make the organisation function more smoothly and quickly, thereby increasing operational readiness. In doing so, it is necessary that, from a mission command philosophy, the organisation enables commanders with combat-service (CS) and combat-service support (CSS) capabilities to achieve readiness for contemporary largescale combat operations.⁴⁷

This SG scalability priority description of mission command can be interpreted as a top-down and result-driven approach, focusing on a mind-set of taking calculated risks as part of professionalism. A bottom-up perception and a staff-oriented approach, focusing on trusting lower levels (crucial to apply mission command) seems to be missing. Risk acceptance is necessary at *all* levels, certainly at the strategic level: without accepting mistakes being made, no trustworthy climate, which stimulates decentralised initiative, will exist. In the action plan for scalable armed forces, the risk acceptance and management is also mentioned as an organisational principle next to mission command. This puts a lot of emphasis on risk acceptance as a requirement for scalability and mission command. Thus, mission command encompasses more than placing responsibility and ownership at lower levels; it requires trust and mutual shared understanding up and down the chain of command both in military and civilian leadership.

In the document *'soepel gereed voor hoofdtak'*⁴⁸ the SG, together with the CHOD, describes the mind-set required for the renewed focus on largescale combat operations. This mind-set is characterised by trust and flexibility and encouraging

initiative. These words are echoed in the principles of mission command described earlier. What is striking, however, is that this mind-set is focused on the day to day management of the ministry of defence and not directly to the way military operations are conducted.⁴⁹ It seems as if it is assumed to be working well in the operational domain.

Two questions arise: (1) is mission command as written down in doctrine being applied in reality, and if so, is it as effective as it is presumed to be? (2) Is mission command only useful in the operational domain, or also in supporting departments and managerial processes, during peacetime? There seems to be a difference in the application of mission command on paper (policy & doctrine) and in reality, and also a difference between mission command in operations and regular management processes. The next section (part three) will provide answers to these questions, with the central theme of scalability in mind.

Fifty shades of mission command & scalability

This section will provide a more in-depth analysis regarding the raised questions about mission command in a scalable Dutch armed forces. First the '*paper-reality gap*' will be addressed, followed by the possible application of mission command in peacetime and during upscaling.

The paper-reality gap

The extent to which mission command is applied in reality, and its presumed success as outlined in doctrine, warrants scrutiny. In theory, the concept of mission command seems clearly articulated. However, variety in definition was found within the Netherlands armed forces, mainly in the definition in the *Dutch Defence Doctrine*, the ECLD workshops and the definition in the *Dutch Defence Vision on Leadership*.⁵⁰ This seems irrelevant but these nuances of language are crucial, as words can significantly impact understanding and implementation.

In practice, the Dutch application of mission command varies depending on the level (tactical, operational, and strategic), task, team structure, culture, leader, followers, and context.⁵² This means that complexity gives rise to a spectrum of grey areas in Dutch mission command application, highlighting the need to calibrate the degree of mission command to suit the specific task, team, structure, culture, and leadership dynamics. For instance, compare mission command applied by Dutch SOF operators in small teams of experienced personnel executing a military-strategic operation or mission command in more hierarchical regular Dutch infantry units executing tasks on the tactical level. Or the application within highly

protocolised command and control units such as the Dutch *air operations control station* (AOCS), or the command centres of submarines or frigates.

This difficulty in adjusting the ‘right level’ of mission command is increased by the context of 21st century large-scale combat operations. The battlefield has become increasingly intricate, with a high degree of mutual dependence among peer commanders, significant time-space factors, and the integration of new technologies.

This means that the reality of mission command in contemporary warfare is characterised by a need for adaptability, flexibility, and decentralisation. As such, it is essential for the Dutch armed forces to reassess the doctrine of mission command in light of these emerging challenges and to develop more nuanced and context-specific approaches to its application, including activation of reserve-units (upscaling). By acknowledging the complexities and variations in mission command, military leaders can better navigate the ambiguities of modern warfare and foster a more effective and efficient command climate.⁵¹

Mission command in supporting processes, during peacetime management and by the civil service

The second question deals with applicability of mission command in support processes, peacetime management and the development and execution of scalable armed forces. As part of the transition to effective scalable armed forces the SG argued that mission command should be the guiding principle during (peacetime) management processes and within the civil service of the ministry of defence. This should result in more efficient and effective output, because it would provide military personnel and civil servants more autonomy and the opportunity to claim ownership while accepting a certain amount of risk.

This could very well be the case, but the same principles which underpin mission command during operations apply: *sufficient trust and mutual understanding, staff mastering their profession, unity of effort, timely and effective decision making and decentralised execution*. This means that after years of budget cuts and working in a highly bureaucratised and compliance-oriented organisation, three main points of concern need to be addressed in order to apply mission command effectively during peacetime management and scalability processes: (1) mutual trust, (2) change of culture, (3) competent team members.

First, for mission command to work there needs to be a certain level of trust between team members and their chain of command (managers). Based on various HR and work experience reports⁵³ there seems to be a lack of trust in the chain of command, among others due to a perceived high degree of control and little room for error. As the newly designed mission command workshop (ECLD) addresses:

“these teams first need to regain mutual trust and understanding.” It is in the name of the workshop: ‘*samen bouwen aan vertrouwen*,’ which translates into ‘*building trust together*.’ This is a step-by-step process, because next to shared experiences, the other two points of concern (change of culture and competent staff) directly affect the level of trust in a team.

Thus, secondly, for mission command to be effective in peacetime and during the development and implementation of Dutch scalable armed forces there needs to be a culture change. From a culture focused on compliance (rule and process oriented) to a culture of readiness (result driven, based on mutual trust). Military commanders and civil managers should trust their subordinates and staff and provide them with a clear intent and sufficient mandate and control. The subordinates in turn need to take ownership and not be afraid of making mistakes. Also, in peacetime management this means risk acceptance on all levels. In addition, this also means that protocols and rules should be supporting and not hindering the process. Strict regulation can greatly hinder mission command, especially when it deprives staff and team members from their ‘freedom of action.’ A lot of these regulations and protocols within the Dutch ministry of defence are self-imposed.⁵⁴⁻⁵⁵

Thirdly, trust, a culture of readiness, staff taking initiative, supported by a minimum amount of rules, are only essential prerequisites of successful mission command if employees on all levels master their profession. Self-steering teams with experienced employees in their specific branch should be able to work with clear intent, feel entrusted, take initiative and achieve results. This requires personnel who are capable and confident in executing their tasks, but also capable of working with mission command. For example, acquiring new qualitative combat gear in sufficient quantities for upscaling only needs a clear intent on the size of the scalable armed forces. *Experienced* staff of the Dutch “Clothing and personal gear department”⁵⁶ can take initiative to rapidly increase and distribute stock. However, new personnel, in changing teams, working in quick emerging networks and project-teams, will not be as experienced in mastering their profession. They will be less capable and often less confident. The way mission command is applied should be adjusted to this situation: team members will need more guidance. And this is the case when starting to scale up: new team compositions with activated reserve personnel and probably even (voluntarily) drafted personnel. This underlines the importance of exercising all the steps of scaling up, getting familiar with each other, with the tasking and with mission command and thereby gaining mutual trust and (self)confidence.

In conclusion, for mission command to be effective in scaling Dutch armed forces, accepting “*fifty shades of mission command*” is necessary. This means that depending on tasking, (ad hoc) team composition, team culture, leader, followers, and its context, a certain ‘level’ of mission command can be applied successfully.

To increase this level of mission command, special attention is needed to increase mutual trust within and between teams (multi-team system), to foster a culture of readiness, to (re)create supporting regulation and to exercise all steps of alerting and scaling up the armed forces.

Conclusion

This chapter addressed the following central question: *how can mission command contribute to the development and implementation of scalability in the armed forces?* In short, it can increase operational and peacetime effectiveness if each department in the Dutch armed forces formulates what mission command implies for them concretely (both operational commands and civil service), and what kind of leadership and followership it requires. The main effort therefore should be building trust in teams and training and education (skills, processes & mission command); specifically, training the process of upscaling in all its facets. A specific point of attention is mission command between teams: creating a multi-team mission command system (a peer network of commanders).

The previous sections outlined that mission command can be successful. However, they also show that effectiveness of mission command depends on the assigned tasks, the team structure and culture, the leaders, the followers and the context within which they all act. Mutual trust and competent team-members are vital, which underlines the importance of training and education in an environment which stimulates trial and error. This means that depending on the task, team and context, a certain level – *shade of grey* – of mission command can be applied and teams can develop its appliance to a higher level. This is only possible if the chain of command is willing to distribute control and really embrace risk acceptance along the way. They need to create a trustworthy environment which stimulates creativity, initiative and cooperation: a good command climate.

In the context of scalability this means that the Dutch armed forces and its various units need to accept the existence of “*fifty shades of mission command*”, because upscaling results in new personnel and differently composed units, which do not have the same level of trust, understanding and experience. It also means that members of the armed forces, and certainly leaders, need to be able to shift their level (degree) of mission command when necessary, in synergy with their leadership style. And finally, it points to the fact that for mission command to be applied effectively, the scalable layers of the armed forces should be familiar with each other and mission command itself and be trained to guarantee a certain level of mutual understanding and trust.

Discussion and recommendations

Discussion

Because of the chosen time frame it was only possible to conduct extensive desk research, next to including some qualitative observations and using secondary data from a short questionnaire regarding *command climate*.⁵⁷ Unfortunately it was not possible to include results from current small scale research projects regarding mission command within operational units, because these have only just started. It was also not possible to use data or more detailed insights from the first iterations of the workshop on mission command – ‘*building trust together*’ – facilitated by the ECLD, because these will only be completed in the summer of 2025.

Secondly, there seems to be a paradox: the need for greater clarity and consensus through the use of unambiguous language and definitions, while also recognising multiple ‘levels’ and various applications of mission command, depending on the task, team, and context (in short). However, it is not meant to be contradictory: if mission command training and education throughout the armed forces provides a clear and consistent foundation, it is the right prerequisite for making concrete translations within specific teams or branches. Without this basis, staff will lack language to fill in the way mission command is effective in their specific context.

Recommendations

The research for this chapter has been limited due to time and its specific scope. Moreover, the Dutch operational plan (how we fight) and the implications of scalable armed forces are only known generally. Therefore it is recommended to extend and further develop research on effective application of mission command and its barriers in practice. In addition it seems worthwhile to conduct field research on trust, mutual understanding and decentralised execution, during training and exercises, preferably with units that are using scalable capacity.

A second recommendation involves integrating mission command in (individual) initial and career training for enlisted personnel, NCOs and officers, including reserve personnel and participants of the so called ‘*service year*.’ But also integrating mission command in the on-boarding of civilian personal and integrating it in their career courses especially at the most senior level. This ensures a common language to create effective mission command in specific contexts. For this to develop it seems wise to stimulate and broaden the ECLD mission command workshop from civilian or mixed teams to military units. In addition, peer-feedback facilitation would strengthen real-life application: community learning and sharing best practices can be helpful.

A third recommendation has already been mentioned in the conclusion: start scaling up; start training. Begin with getting familiar and building trust and mutual understanding. Get to know each other and become skilled in tasks and procedures in such a way that decentralised initiative becomes second nature.

Notes

- ¹ NLD Transition Team CHOD, *Action plan scalable armed forces*, November 2024.
- ² NLD MoD, Letter to the parlement, titled: *Een dienmodel dat past bij een schaalbare krijgsmacht*, 2024: <https://www.rijksoverheid.nl/documenten/kamerstukken/2024/06/03/kamerbrief-over-een-dienmodel-dat-past-bij-een-schaalbare-krijgsmacht>
- ³ *Ibid.*, 2.
- ⁴ This analysis consisted, among others, of 40 interviews with key stakeholders ranging from the commander of the Netherlands Army and Navy to the director of operational readiness (DAOG) and senior policy makers.
- ⁵ NLD Transition Team CHOD, *Action plan scalable armed forces*, November 2024.
- ⁶ NLD MoJS & MoD, Letter to the parlement, titled: *Weerbaarheid tegen militaire en hybride dreigingen*, 2024: <https://www.rijksoverheid.nl/documenten/kamerstukken/2024/12/06/tk-weerbaarheid-tegen-militaire-en-hybride-dreigingen>
- ⁷ NLD Transition Team CHOD, *Action plan scalable armed forces*, November 2024.
- ⁸ NLD Transition Team CHOD, *Action plan scalable armed forces*, November 2024.
- ⁹ NATO, *Allied Joint Publication 01: Allied Joint Doctrine* NATO Standardization Office (NSO) December 2022, 84–87. <https://www.cimic-coe.org/resources/external-publications/ajp-01-edf-v1-f.pdf>
- ¹⁰ NATO, *Allied Joint Publication 01: Allied Joint Doctrine*.
- ¹¹ *NATO AJP-01, UK Leadership doctrine, US ADP6-o and the Dutch Defence Doctrine*.
- ¹² *The conference took place on the 28th of November*. <https://www.army.mod.uk/support-and-training/our-schools-and-colleges/centre-for-army-leadership/cal-conferences/>
- ¹³ Eitan Shamir, *Transforming command, The pursuit of mission command in the U.S., British, and Israeli armies*: part I en II.; Anthony C. King, *Command, The twenty-first-century general*, 56–72; Andrew Hill and Heath Niemi, “The trouble with mission command: Flexive command and the future of command and control”, 94–100.; Katie Crombe and John A. Nagl, “A call to action: Lessons from Ukraine for the future force”, 19–29.; Russel W. Glenn, “Mission command overview”, 1–26; Anthony C. King, “Mission command 2.0: From an individualist to a collectivist model”, 7–19; Donald E. Vandergriff, *Adopting mission command: Developing leaders for a superior command culture*, 20–23, 236–242.
- ¹⁴ Shamir, *Transforming command*, 36–53.
- ¹⁵ Jaap Jan Brouwer, *Auftragstaktik en het Pruisische/Duitse leger*, 11–23.
- ¹⁶ King, “Mission Command 2.0” (2017), 8; VanderGriff, *Adopting mission command* (2019), 23–55.
- ¹⁷ Brouwer, *Auftragstaktik* (2017): chapter 2.
- ¹⁸ Shamir, *Transforming command* (2011), 36–53.
- ¹⁹ Next to the Air-Land Battle, it was based on various wars, among others, from a U.S. and U.K. perspective, the Vietnam War and Falklands War. From an Israeli perspective the Yom-Kippur war, the first Lebanon war and the first Palestinian uprising.

- ²⁰ King, “Mission command 2.0”, 7–11; Shamir, *Transforming command* (2011): chapter 3 and 7; VanderGriff, *Adopting mission command*, 20–68.
- ²¹ King, “Mission command 2.0”, 11–19.
- ²² Stephen J. Zaccaro, Michelle A. Marks, Leslie A. DeChurch (Eds.), *Multiteam systems: An organization form for dynamic and complex environments*.
- ²³ King, “Mission command 2.0”, 11, 17–19.
- ²⁴ King, “Mission command 2.0”, 327.
- ²⁵ Brian McCoy, *The passion of command: The moral imperative of leadership* 6, 20.
- ²⁶ Crombe and Nagl, “A call to action”, 20–21 & 24–26.
- ²⁷ King, “Mission command 2.0”, 15.
- ²⁸ Shamir, *Transforming command*, 5.
- ²⁹ Laurens van Leussen, “Opdrachtgerichte commandovoering. Het geheime wapen voor een robuuste en wendbare krijgsmacht”, 71.
- ³⁰ Crombe and Nagl, “A call to action”, 23–24.
- ³¹ Crombe and Nagl, “A call to action”, 22–26.
- ³² Thijs Cremers and Han Bouwmeester, “Russian commercial warriors on the battlefield”, 415–437.
- ³³ Crombe and Nagl, “A call to action”, 22–26.
- ³⁴ Laurens van Leussen, “Opdrachtgerichte commandovoering”, 70.
- ³⁵ *Ibid.*, 22–26.
- ³⁶ Peter Schrijver, “The wise man will be master of the stars”, 77–95.
- ³⁷ Strategic Studies Institute & US Army War College, *Mission command of multi-domain operations, A US Army War College student integrated research project 2020*: SSI. <https://press.armywarcollege.edu/monographs/918/>
- ³⁸ Hill and Niemi, “The trouble with mission command”, 94–100.
- ³⁹ Robert Rose, “Preventing a short jump across a wide ditch. Fully embracing mission command to avoid a multi-domain disaster”, 41–53.
- ⁴⁰ Jamon K. Junius, “Mission command: An essential component in Ukraine’s fight against Russia”, 115–130.
- ⁴¹ Note to the Dutch Defence Doctrine and the NATO AJP-01, see: US Army department, *ADP 6-0. Mission command. Command and control of army forces*. US MoD July 2019: 1/6-1/14.
- ⁴² Shamir, *Transforming command...*, 36–53.
- ⁴³ *In Dutch: De Nederlandse Defensie Doctrine (NDD)*
- ⁴⁴ NLD MoD, *The Dutch Defence Doctrine, 2025*. <https://www.defensie.nl/downloads/publicaties/2025/02/28/nederlandse-defensie-doctrine>
- ⁴⁵ *Competence, mutual trust, shared understanding, commander’s intent, mission orders, disciplined initiative and risk acceptance (U.S. ADP 6-0)*.
- ⁴⁶ Based on internal communication with members of the Dutch ELCD.
- ⁴⁷ Based on internal communication with members of the NLD Transition Team CHOD.
- ⁴⁸ Based on internal communication on the Dutch MoD network: so called “intranet.”
- ⁴⁹ Based on internal communication with members of the NLD Transition Team and on the Dutch MoD network: so called “intranet.”
- ⁵⁰ *In Dutch: Visie Leiderschap Defensie (VLD) – 2023*.
- ⁵¹ Kevin van Loon, “Command Climate. Een exploratief onderzoek.”, 160–171.
- ⁵² Laurens van Leussen, “Opdrachtgerichte commandovoering.”, 68–71.
- ⁵³ Multiple recent internal MoD HR reports indicated high numbers of staff mistrusting leadership (in general), and showed leadership issues as the (second) most important reason to leave the armed forces.

- ⁵⁴ <https://www.defensie.nl/actueel/nieuws/2023/06/27/onderzoek-wijst-uit-regelgeving-zit-veiligheid-bij-defensie-in-de-weg>
- ⁵⁵ Schwitter, “Onzichtbare barrières: hoe ongeschreven regels in de bedrijfsvoering de groei van Defensie belemmeren”.
- ⁵⁶ *In Dutch: Kleding- en Persoonsgebonden Uitrustingsbedrijf*.
- ⁵⁷ Attending brainstorming sessions for designing the mission command workshop, facilitated by the ECLD. Attending the mission command conference hosted by the UK Centre for Army Leadership. Attending multiple meetings and sessions of the CHOD transition team regarding scalability and analysing results of 40 interviews with stakeholders.

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PART 3

Enabling Scalability

Creating support for conscription: The dilemma of scaling up human resources

René Moelker and Jörg Noll

Abstract

In this chapter, diverse models of conscription are compared with the All Volunteer Force formula. Strengths and weaknesses of the diverse options are considered and possibilities for societal support are examined. If the armed forces are faced with severe crises and/or when they are confronted by war, scaling up the All Volunteer Forces will swiftly be running against limits. It will prove impossible. Some form of conscription will prove unavoidable in order to generate a substantial reserve component. Such a situation may never occur, but should it occur can the Netherlands afford not to be prepared?

Keywords: Conscription; All Volunteer Force; Service year; Societal support

Introduction

Without viable and sustained military preparation, one can surely expect dire consequences. One might easily be militarily or politically compromised. Conscription is often mentioned as a means to involve the whole of society in military preparation.¹ Thus the debate on conscription is reoccurring in the media, politics, and within the armed forces. As recently as December 2024, an internal talking paper of the armed forces on reinstating conscription became part of public debate and drew the attention of journals and the morning news. Conscription is often seen as a panacea for many societal problems, whereas the complexity is usually greater as this talking paper acknowledges.² Upscaling training facilities, instructors, and infrastructure is required as a precondition.

Scaling up is a matter of perception, specifically threat perception. It regards not only external threats. Scaling up to the maximum would lead to a garrison state³ such as can be seen in North Korea. However, the armed forces in North Korea are not only meant to deter external threats, but they serve the domestic purpose of maintaining the status quo and system survival as well. The objectives of scaling up (or down) the military force structure differs from state to state, and it is not always only about security. Maintaining the military-industrial complex is

an objective of scaling as well, just like protecting the sovereignty of a nation, or deploying armed forces domestically. Answering the questions ‘What threats are perceived and to what degree do they threaten system survival?’ also answers the question to what extent scaling up is desired and whether or not scaling up implies reinstating conscription.

Scalability points to the possibility of scaling up and scaling down according to necessity, but an organisation that is growing or downsizing will also be confronted with qualitative challenges. Scholars in the sixties and seventies discussed the end of mass armies,⁴ and with this end, they not only referred to a quantitative phenomenon and the end of Fordistic organising (referring to standardisation common to the automobile industry, mass production and preferring quantity above quality). Soldiers in Fordistic organisations were obeying commodities and were not required to think. Involuntary recruitment systems, hierarchical leadership, and traditional war-fighting implied mandatory conscription that purposely excluded women. Nowadays organisations face the challenge of scaling up, but just as in the nineties, qualitative changes are implied. Scaling up is not only a quantitative issue, because the diversity of threats also requires a diversified answer. Creative solutions, smaller units, higher agility, and a more diversified way of organising are required. In this chapter, the focus is on staffing the armed forces. Scaling up staffing is also quality-driven. Not only are the numbers required, but also highly skilled and professional soldiers. Dumb cannon fodder is not what modern organisations need. Smart organisations need smart personnel.

The objective of this chapter is to explore the possibilities of different staffing systems, and more specifically diverse types of conscription, as a means of scalable armed forces. Many questions will be addressed in an attempt to explore the diversity in staffing systems until we arrive at some basic dilemmas that need to be resolved.

1. How did scalability become a priority since suspending conscription in the nineties? To answer this question we will turn to recent history and geopolitical developments.
2. Is the All-Volunteer Force able to meet the requirement of scalability? The present system of staffing the armed forces meets the purpose of participating in peacekeeping and Operations Other Than War, but is it suitable when the tasks shift to defending NATO territories in war-like situations?
3. What are the possibilities of scaling up by using Reserve Forces? Reserve Forces always are central to mobilisation planning and thus the opportunities for using the reserves need to be examined.
4. What are, comparing domestic experiences and best practices abroad, the possibilities of using voluntary conscription to scale up the armed forces’ organisational size. Three main systems will be discussed: 1. Wide and representative

- (proportion of conscripted individuals), heterogeneous (in motivation), but rather male dominant systems; 2. Narrow (proportion of conscripted individuals), homogeneous (in motivation), and male-dominant; 3. Narrow (proportion of conscripted individuals), selective and homogeneous (in motivation), and gender neutral.
5. What constraints (or enablers) apply to compulsory conscription? Societal support is one of the concerns here. Likewise are political agency and political will.

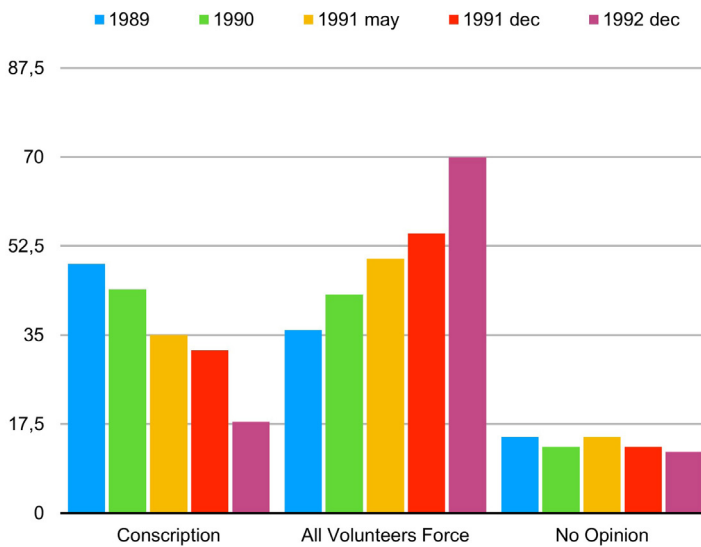
In answering these questions, structural factors and political actors play a key role and their interplay can hardly be discerned; but in an endeavour to analyse the problem, we will encounter the interdependencies. We end the chapter with conclusions and recommendations.

How did scalability become a priority since suspending conscription in the nineties?

Since scalability is connected to threat perception and the threat of the Soviet Union evaporated, the armed forces in the Western world were reduced in size. Conscription was perceived no longer to contribute to our security. In 1990 only the United Kingdom and Ireland supported an All-Volunteer Force, but most Western European countries suspended conscription rather fast. The Netherlands suspended conscription in 1997. Next to other factors suspending conscription was driven by financial motives. Collecting the peace dividend made this choice easy. According to Schinkel in the NRC, 135 billion euros has been saved because the two per cent NATO norm has not been met from the 1990s to the present. Only after the Russian invasion of the Krim, were expenditures for Defence raised to finally meet the norm of two per cent in 2024.⁵ In an interview with NRC, the trending historian Timothy Snyder stated ‘If Ukraine had not defended itself, Europe would look very different today. Your defence budget would already be at 6 percent’.⁶

Austerity was a motive for down-scaling the armed forces and in effect the numbers in personnel have dropped to circa 50,000 soldiers in the present.⁷ Conscription, including the mobilisation of the reserve troops, enabled the armed forces to operate on a much larger scale than today. Mobilisation made it possible to field 280,000 soldiers in 1940. The standing forces during the Cold War without reserves were about 130,000. The armed forces from the early nineties thus were about three times larger than today.

Figure 11.1: Decreasing public support for conscription (Meulen, 2003)



Using conscription to scale up the armed forces depends to a high degree on the subjective feeling of justice. When only a small part of the male population is drafted, the fairness of the system is disputed. At the time when Minister ter Beek decided to suspend the draft, only about 36 to 37 per cent had to serve in the armed forces (55 per cent in 1960).⁸ Given the planned reductions in the armed forces, this percentage would drop even further if the draft was to be maintained. After the downsizing that was envisaged in the *Defensienota 1999* and the *Prioriteitennota* (Defense White Paper 1999 and Defence Priorities Review), the situation would come down to twenty-six out of every hundred young men who would see service.⁹ For this reason, it was feared that societal support for conscription would drop. Many conscripts were bored and did not often participate in challenging exercises and thus considered their year-and-a-half in the Army a waste of time that, according to this study, put them at a disadvantage in their careers compared to those who had not served. As Figure 11.1 shows, the decision to suspend the draft was backed by public opinion. After 1989, societal support dropped from 49 per cent to 18 per cent only a few years later. In December 1992, 70 per cent of the responders favoured an All Volunteer Force (Figure 11.1).¹⁰ The suspension of conscription reflected these changes and recognised that compulsory military service was no longer appropriate in modern society. All in all, the suspension of conscription was seen as a step towards a more contemporary approach to national security and individual freedom in the Netherlands.

Scaling up follows a reversed logic. First of all, it will be costly, but parliament has already decided to increase the budget. Secondly, societal support, or public opinion, is *conditio sine qua non* for the armed forces organisation to grow in number and whatever staffing system will be chosen, public support will be one of the key points in decision-making. Social support will probably be more complex to politically manage, because the demand on the organisation is also more complex. Public opinion will be impacted, as in the past, by perceived fairness. But the future staffing system will also have to be inclusive (also from a legal perspective), compulsory recruiting will be experienced as overly coercive (thus systems need to be more or less voluntary), and the future system will have to meet the security demand. If the threat level is perceived as low, the willingness to serve will drop. From 2010 to 2024 (and especially after 2014) the countries neighbouring Russia felt threatened to a high degree, and as we will discuss below all of these neighbouring countries adopted or continued ameliorated systems of conscription to ensure military security.

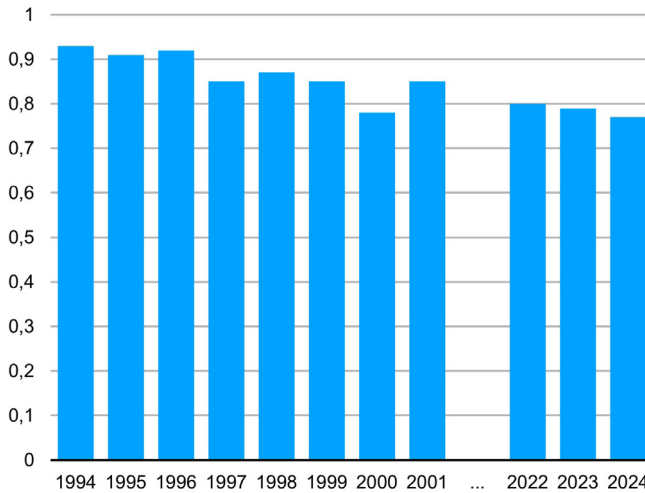
Is the All-Volunteer Force able to meet the requirement of scalability?

The short answer is ‘no’. All countries using the AVF formula face recruitment problems. The Netherlands is no exception because all countries have problems with elasticity, quality, labour market, and the growth of the organisation. We will elaborate on these four problems here below.

Large organisations mostly have low elasticity or flexibility. Large organisations mostly adjust their course with the speed of mammoth tankers. It takes several years to either upscale or downscale. Elasticity is not a characteristic of bureaucratic organisations. For example, as mentioned above, in order to scale up the organisation needs housing for recruits, and it needs instructors. The All Volunteer Force is a lean organisation that is flexible regarding expeditionary operations, but that cannot provide housing nor training to the large numbers that a war situation would require.¹¹ The design of the All Volunteer Force uses the Just-In-Time and Just-Enough principles.

The problem is not only quantitative but is also related to quality. To enhance quality, organisations want more diversity and inclusion. Legal requirements state that equal opportunity is pivotal to the recruitment process. But the armed forces also need to be inclusive to meet the numerical exigencies of the organisation. Only 12 per cent of Dutch military personnel are female.¹² Other forms of diversity score even more poorly.¹³ To be scalable the armed forces desperately need to upscale inclusivity. It is a requisite of recruiting that one tries to fish in wider and deeper waters to tap into unused reservoirs of personnel.¹⁴

Figure 11. 2: Fill rates through the last 30 years. Source: Moelker et al. (2005) and Ministerie van Defensie 2024b Stand van Defensie najaar



The labour market is not able to supply the organisation with a sufficient number of service members. Already in 1992 the question to be answered by the advisory think tank *Commissie Dienstplicht* was: ‘whether it was desirable or necessary to abolish conscription or to dismiss conscription altogether’. The committee was to consider societal acceptance of conscription, the financial cost, and the possibility of staffing the armed forces.¹⁵ From reports by the MoD, fill rates were only at acceptable levels in the first years (1994–96) and thereafter dropped below 80 per cent structurally when the draft was suspended. Up to the present the fill rate has never risen above 80 per cent, not even during the economic crisis in 2008–2010. Thus, the fill rate is deteriorating even though the latest reports claim optimistic ambitions and several successes.¹⁶ The numbers, however, defy optimism. The labour market situation resulted in 5,000 vacancies in 2005 rising to circa 10,000 vacancies in 2024.

The remarkable thing is that recruitment is successful, but since the organisation is also growing, fill rates are declining. The white paper Ministerie van Defensie. 2024a. *Stand van Defensie najaar* reports 4,700 new appointments resulting in a total number (civilians, reservists, and standing forces) of 71,811 full-time equivalents (civilians and military personnel). But this is the problem, ... the budget has almost doubled and the Netherlands now reaches the two per cent NATO norm, but the number of new positions goes up to 1271 whilst realisation lags behind with 338 professional soldiers.¹⁷ Although the exact number of vacancies remains disputed and depends on definitions, the trend is worrisome. We had 5000 vacancies in 2005 in a situation where the armed forces had a budget of one per cent of

GDP. We have circa 10,000¹⁸ vacancies in 2024 whilst the budget is upped to two per cent of GDP, thus it is safe to assume that we will have even more vacancies in a hypothetical situation where we grow to a budget of three per cent of GDP.¹⁹ The linear extrapolation does not allow for an exact prognosis but it is safe to claim that the labour market is not able to supply sufficient new service members. Moreover, a recent study by the Research Centre for Education and Labour Market (ROA) states that the growth in vacancies is even steeper in education, care, technical occupations, and ICT but the security sector is in the same ‘bottleneck’ position; demand exceeds supply and the armed forces have to compete for staff with all other sectors that can often offer higher wages.²⁰ The possibilities for upscaling the All-Volunteer Army are slim. The actual number of appointments may be on the rise but the organisational growth is even higher.

The prognosis from ‘Committee Dienstplicht’ was based on calculations from 32 years ago but the results still seem valid today. According to the committee’s calculations, an armed force consisting of just under eighty-thousand men in peacetime would need to recruit over 13,000 military personnel annually to fill its vacancies. The committee argues that sufficient candidates can be recruited if the armed forces aligns its requirements with prevailing levels of education, adjusts its terms of service and recruitment strategies, and re-examines the selection process. Scaling up the All-Volunteer Force to around 80,000 is already a challenging endeavour, and under present day conditions the old prognosis that annually 13,000 recruits will be needed is plausible considering future organisational growth. It is fair and honest to acknowledge that under present labour market conditions, the all-Volunteer Force cannot meet the requirements of scalability.

What are the possibilities of scaling up by using Reserve Forces?

Reserves would be the ideal solution for scalability. The principle complies with the latest ministerial policies that propose a service model with concentric circles.²¹ The first circle in the service model refers to all personnel assigned to operational duties. The second circle is staffed with supporting officials, be they civilian or military personnel. In a conflict situation, some of these employees can be transferred to circle one. The third circle consists of reservists. About 7,300 reservists are contracted by Defence, which is increasing. The fourth circle consists of the cooperation with society and market players for services that Defence cannot or does not need to provide itself. Society can provide all kinds of services: from hospital beds to cybersecurity, from logistics to production capacity.

In 2024 Globalfirepower.com ranked the Netherlands 85th regarding the number of reservists. Defence wants to triple the number of reservists in six years.

Now there are over 7,300 reservists, but due to the increased threat of war, the number of part-time military personnel should grow to 20,000 by 2030.²² For this, the armed forces are enlisting the help of industry. Considering this ambition of the Netherlands to scale up to 20,000 reservists, they would (if other countries do not change) occupy 77th on the Globalfirepower ranking. Thus even when the Netherlands succeeds in upscaling the reserve forces they would rank well below comparable countries and way lower than their economic rank (number 5 in the EU, number 18 worldwide).

But how many reservists would ideally be required if the threat is high. How many reservists would the Netherlands need in addition to its present force structure of fifty-thousand full-time professional soldiers? That is what journalist Karel Berkhout²³ asked a specialist only two years ago: 'Ideally, behind every professional soldier there are three reservists,' answered Reserve Colonel Dick Scherjon, until recently head of the organisation of reservists. According to him, the full-time soldiers do the day-to-day operations: 'You catch the peaks with part-timers, reservists who combine a civilian job with military duties.' If Scherjon is right, and he specialised in the reserve units all his life, then the Netherlands would need 150,000 reservists.

For the near future, i.e., the year 2025, the ambition is set on 10,000 reservists²⁴ Although this is much lower than the 150,000 reservists specified by Scherjon, the ambition of appointing 10,000 reservists is not realistic. Even though the Netherlands stimulates employer support and compensates employers, due to the competition in the Dutch labour market, it is hard for employers to miss out on the labour force. Employers can claim an allowance of €55.00 per working day, throughout actual service for a maximum of 5 days per week. This allowance can be applied for a maximum of one consecutive year.²⁵ But what employer can afford to let go his/her employees at this level of compensation? Creative solutions like time-sharing of human resources might in part lighten the problem. The MoD also offers covenants that make it easier for employers and employees to offer special leave regulations (*bijzonder verlof*).

Some high-ranking countries, high on the number of reservists, like the UK and the USA (both circa 800,000 reservists), do not depend on conscription, but many countries that rank high, use conscription as a recruitment base. Acceptance and support for conscription and the reservist system depend on threat perception and willingness to defend the country. Ukraine has a population of 37 million. Ukraine's Army counted approximately 2.2 million military personnel as of 2024. The reserve force pool numbered 1,200,000. Sweden has a population of 10 million. The Swedish armed forces are made up of 25,600 active personnel, 11,800 military reserves, 22,200 Home Guard and 6,300 additional conscripts yearly into the Reserves (set to increase to 8,000 conscripts yearly by 2024) as of 2023.²⁶

A study on Nordic countries by Besch and Westgaard concludes that ‘Mandatory and lottery-based service models can significantly widen the recruitment pool. Their domestic acceptance depends on a high willingness to serve. Selective compulsory service models aim to select only the most highly motivated and capable recruits to meet specific needs. These models are attractive because they seem to have found a way to make duty voluntary. In practice, all countries in Europe’s north and east examined here have in recent years been able to draw from a pool of willing recruits and, in some cases, volunteers.’²⁷ Each country is different and deploys a different model of conscription, but in general all types of conscription can help to augment the number of reservists.

What are the possibilities of using voluntary conscription to scale up the armed forces’ organisational size, comparing domestic experiences and best practices abroad?

Besides compulsory conscription, many more types of conscription are optional. In the 19th century the Netherlands used a substitutes system. The wealthy could, in this system, pay a placeholder (the substitute) to take over the obligation to serve. Besch and Westgaard’s study of Nordic countries²⁸ distinguishes mandatory service (Finland, Estonia), lottery-driven conscription (Denmark, Latvia and Lithuania) and selective compulsory conscription. Countries like Greece, Turkey, Austria and Switzerland have compulsory conscription, but even within this type of conscription there are variations. The Swiss armed forces for example are based on a cadre-militia system. The voluntary character varies also from country to country. There is often an alternative to opt for community service (*Zivildienst*).

When Dutch citizens become 17 years of age they receive a letter informing them about the ‘opkomstplicht.’²⁹ Compulsory service does have back doors for those who do not want to serve. In the case of compulsory service, it proves fairly easy to manipulate the system and get rejected during the inspection before serving. The highly entertaining book of the Dutch sociologist Herman Vuijsje³⁰ is all about a generation in the seventies in Amsterdam who knew how to effectively dodge the obligation to serve by faking health problems or homosexuality (which was a reason for rejection in those days). According to Vuijsje nobody in his³¹ right mind would be willing to serve, and those who were willing to serve were not ‘cool’ and objected to ridicule in Amsterdam social circles. The army was for losers. Nowadays, Vuijsje regrets this mindset. Because Vuijsje sees the advantages he now is a promoter of conscription.

The reason why selective compulsory conscription is successful in Sweden and Norway is that it is considered ‘cool.’ It almost is an honour to be selected. This

model inspired the Dutch to introduce the ‘dienjaar’, the service year. The service year in the Netherlands started as an experiment, and is considered successful and a tool for upscaling the organisation. The service year is voluntary. In October 2024, the Dutch armed forces periodical *Sterker* reported that 447 youngsters had started the service year. This number will probably rise and the objective is to appoint 1000 youngsters in the service year by 2025. The good news, according to *Sterker*, is that from 136 people who started the first experimental edition of the service year in 2023, three-quarters (102) have decided to stay within the armed forces.

The service year seems to have real potential. Three-thousand youngsters have sent applications to sign up for the service year since the start of this program.³² And 30 to 40 per cent are selected after psychological testing and screening. About 1000 youngsters are being tested and screened. The main barrier at this moment, according to the document Ministerie van Defensie. 2024b. *Stand van Defensie*, is the absorption capacity of the armed forces itself. At the moment the recruits are trained in educational centres, but if the service year is overly successful it might affect operational readiness. Training and educating recruits requires infrastructure and instructors, and these are not easily available, therefore training impacts military readiness which causes operational units to be hesitant since they already lack sufficient staffing.

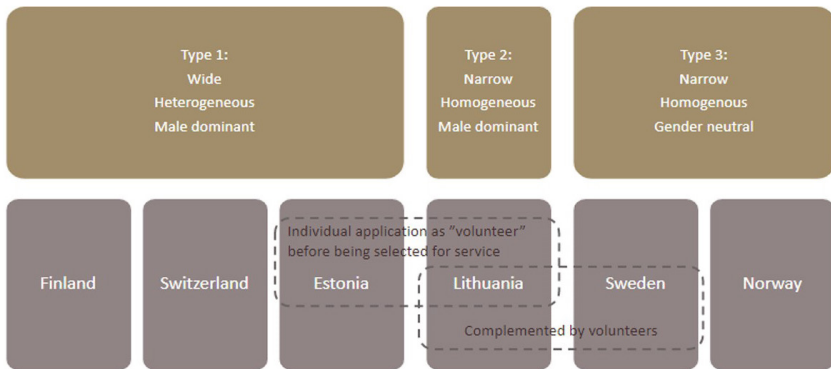
Many other NATO members face the same challenges and use conscription as a means to resolve staffing demands. Most of the time, societal peculiarities lead to different solutions across Europe, but conscription is enjoying a rise in popularity in many countries. Depending on threat perception, many countries have already adopted some kind of conscription. Interestingly, conscription is not only about scaling up (or down) the number, it is also about differences in societies. That is also why one type of conscription is more fitting and adequate than the other type. Johnson and her colleagues compared six countries that are relevant to the Dutch security situation as well. They studied Norway, Sweden, Finland, Switzerland, Lithuania and Estonia.³³

Three types of conscription are identified in this study: ‘1. Wide and representative (proportion of conscripted individuals), heterogeneous (in motivation), but rather male dominant (Estonia, Finland, and Switzerland); 2. Narrow (proportion of conscripted individuals), homogeneous (in motivation), and male-dominant (Lithuania); 3. Narrow (proportion of conscripted individuals), selective and homogeneous (in motivation), and gender neutral (Norway and Sweden).’³⁴

The first type resembles the traditional conscription comparable to the conscription that the Netherlands was familiar with during the Cold War. This model is not very inclusive, but it does serve well the purpose of socialisation in values and norms. We will elaborate on that in the following section. The second type is similar but has a large proportion of volunteers and highly motivated conscripts.

The third type is most similar to the Dutch service year. It drives on motivation and is open to all genders. Volunteers of course are very much welcomed. Motivation is remarkably high because recruits deem it an honour to be selected and, when people decide to return to civilian life, the experience improves their labour market position. Still, the dilemma remains for Sweden and Norway because selective compulsory conscription will not suffice in the case of a large-scale invasion by a hostile neighbour. Sweden and Norway as a whole is a large territory that is not densely populated. The paradox is that it is not easy to attack this territory, but neither is it easy to defend it. Norway and Sweden do resort to a *whole of society* ideology to compensate for the defence capabilities they presently lack. It remains to be seen whether the ideology can be put into practice when Nordic countries are challenged in reality. To have some kind of insurance policy, international military cooperation is seen as a necessary prerequisite to guarantee security. It is not hard to understand why NATO is seen as an important and necessary alliance.

Figure 11.3: Different types of conscription systems in the six selected countries



The chosen staffing system depends on the objectives that you strive for. If the Netherlands wants to prepare for the worst case scenario, meaning an attack that infringes territorial sovereignty, it will have to consider a mobilisation strategy that opts for large quantities. This consideration even holds true for Article Five operations. In aiding NATO members, large(r) quantities of personnel would be helpful. The third type of conscription, the selective compulsory conscription, is appealing because the service year already is the first step in this direction and only needs expansion. The service year also is an adequate tool to raise the number of reservists, and thus service year and the reservist system go hand in hand. But when the need is for serious escalation, neither the service year nor the reservist pool will suffice in putting up the quantities required. So the question remains 'how

serious is the threat and how is this threat perceived.' Policy makers at the MoD will try to put numbers to this question in April 2025 in a 'operational plan' that will discuss 'how we fight.'

What constraints (or enablers) apply to compulsory conscription?

The choice for whatever manning system in the end is up to the actors in the decision-making process. This was the case regarding the suspension of conscription in the nineties³⁵ and it will be similar in future decision-making regarding staffing systems. After the publication of the 1991 *Defence Paper*, Defence Minister Ter Beek was increasingly convinced that the Netherlands needed an expeditionary force that could contribute to peace and stability around the world.

But the minister was confronted with a very reluctant Army that did not want change and that had ruled out any future scenario without conscription. Ter Beek was so fed up with the tactical games of the armed forces that he didn't even want to enter into discussion with the Army brass: 'I knew their arguments (...). I was surprised that I dared to go against the generals, but after such a long time at the ministry I knew a lot (...).' Ter Beek presented his ten-point plan on March 31, 1992. That conscription would eventually be suspended in the Netherlands actually only became clear after the speech. In the end his vision of the future armed forces, together with social inequality and changed public opinion, was the deciding factor.

The agency of political actors in parliament, societal actors and civil servants at the Ministry of Defence (i.e., the generals) will open windows of opportunity. At the moment some strong political parties in the Netherlands are focused on domestic issues and give less priority to international politics, whereas a few parties would support innovative decision-making. Scaling up the budget, as we've discussed above, is decided upon, but will the budget be raised even more given the present pressures? Confessional parties and some others are sensitive to moral arguments, meaning that conscription also has a formative value that contributes to the socialisation of young people and thus favour conscription as a manning system. But most important will be societal actors who respond to and act on the threat perception. That will trigger political agents.

In public opinion research, such as the European Values Survey, threat perception translates into the question of whether people are willing to defend their own country. The Netherlands is often at the lower end of the ranking, meaning that the Dutch are least willing to defend their country. The result however is not surprising if one takes a look at the map of Europe. All countries bordering Russia have a higher prominence of the importance of preparing for a possible conflict. And almost all of these countries have kept or reactivated conscription as a staffing

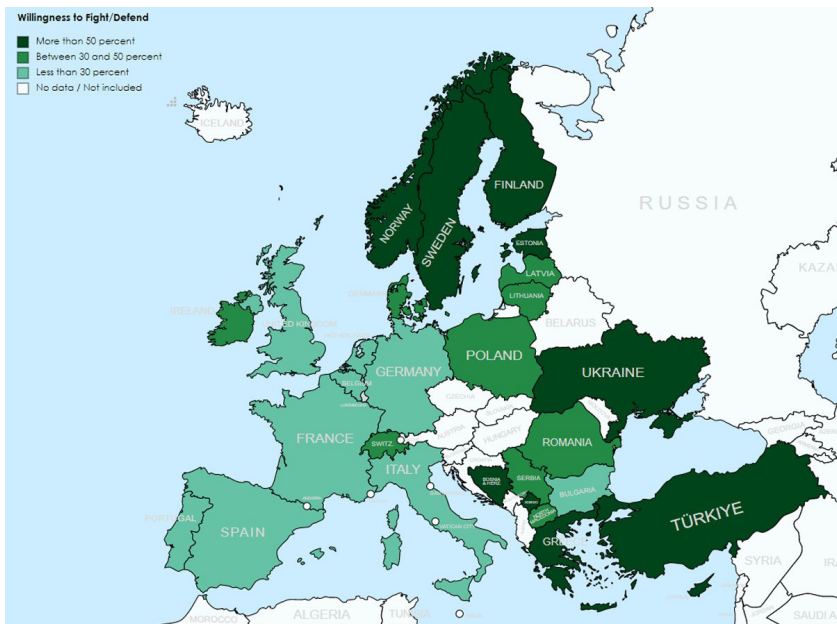
system. The Dutch perception that conflict is far away, ignores the fact that cyber-war and media warfare is already happening and experts claim that we are already at war. This seems a valid claim because Netherlands weapon systems are already at Ukraine's disposal. So we are indeed involved.

According to research conducted by the TV programme *EenVandaag* in January 2025, among some 2,900 participants up to 45 years old, 58 per cent would approve of active duty returning to the Netherlands. But far from all young people who can fight would pick up arms: more than half would object to a call-up by the army. Among people who consider themselves physically able to join the fight, one-fifth (20 per cent) would be willing to do so if they received a call to defend the Netherlands in a war. They consider it important to defend freedom in the Netherlands and feel a responsibility to contribute to this themselves when the need arises. The willingness to defend the Netherlands is on the rise, but still, psychologically, the threat of Russia is far away.

Van den Doel explains this by referring to the philosopher Revel. Van den Doel states 'According to French philosopher Jean-François Revel, people in a democracy tend to disregard or even deny the threats to which they are exposed. This is exactly the situation that applies to the Netherlands. According to Revel, society becomes alarmed only when doom is very close and clearly fatal, leaving no time to reverse the danger.'³⁶

Political agents will not move towards large-impact decision-making while public opinion is not yet convinced of the threat, so the most likely decision-making will pertain to incremental decisions. Expanding the service year is feasible. Trying to scale up the reserve pool is relatively harmless and will effortlessly receive societal support. Reactivating large-scale conscription will only be supported at this moment if great changes impact/shock public opinion and change the threat perception. Will the Dutch wake up when Lithuania is attacked, or do they wait until the Russians are close to the Dutch-German border at Lobith?

The constraints regarding decision-making on conscription lie in political agency, threat perception and public opinion.

Figure 11.4: Will to fight/defend your own (EU) country³⁷

Conclusion and recommendations

Scaling up human resources by use of conscription is difficult. Diverse staffing models are possible. In the Netherlands, the most prominent models are the service year model and the reserve pool model. These models show potential and the execution of these models is feasible and politically attainable. The use of scale-up by use of these models however is limited. Budgetary limitations are not the largest barrier, although policy makers must always prioritise and allocate financial means to specific purposes. But in present times, due to the urgent situation³⁸, politicians and society agree that the availability of budget is the least of limitations. The budget might go up to 3 per cent or higher with geopolitical pressures.

A much larger limitation relates to the labour market. Given the shortages in the labour market in general it will be difficult for organisations to grow according to the required need. If the budget grew even more, and given all developments this is something to reckon with, the organisation would want to fill 15,000 vacancies or more. Without compulsory conscription, this is an impossibility. The reservist pool could be scaled up, but even the objective of 20,000 reservists is, by international comparison, insufficient to fulfil the primary task of the armed forces. A reservist

pool, that is a serious force to be reckoned with, should be three times the number of the active serving component of the armed forces (so if the active component is 50,000, the reserve component should be 150,000). Anything less is not serious when preparing for a possible attack on national borders. The easiest way to scale up reservist pools is via conscription. A study of the UK and USA reservist model is recommended since these countries realise a considerable reservist pool without a conscription base.

The primary task of the Netherlands armed forces is defending sovereignty and national integrity. Confronted with a real attack on Netherlands territory, compulsory conscription is inescapable. Even given the duties in the context of Article Five operations, serious scaling up would require compulsory conscription. A force structure of 100,000 service personnel would annually require the recruitment of 15,000 recruits. These numbers were already calculated in the nineties and recent developments prove that these calculations still stand. Ideally, one would wish for 150,000 reservists (when the standing forces number 50,000) who can be called in when emergency arises. When scaling up the standing forces to 100,000 one would want the reserves to number 300,000. Without conscription only marginal scaling up is attainable. Discussion papers that internally circulate in the Ministry of Defence are a first step to a growing awareness. To take this discussion on reactivating conscription to the public domain is the second recommendation.

But on the other side, public opinion is not ready to support conscription models other than the voluntary form of the service year. The service year is a good start, but not sufficient in case we need to scale up. The threat is perceived to be distant, whilst our computers are already trolled by foreign adversaries. Thus the dilemma remains. The need to scale up is present, whilst the psychological need to activate agency is not yet felt. It is like the former Chair of the NATO Defence Committee, Rear Admiral, Rob Bauer, RNLN, formulated, 'We must prepare for the inconceivable,' but if the threat is inconceivable, how should we prepare? The third recommendation is to invest in psychological awareness and public opinion communication strategies.

One last remark: scaling up invokes the self defeating prophecy. When scaling up by reinstating conscription is effective in deterring bellicose attempts of foreign powers to infringe on national sovereignty it will appear like conscription was not necessary and that the money and effort spent is wasted. But not scaling up might be interpreted as an open invitation to invasion. Hence the dilemma.

Notes

- ¹ United Nations Educational, Scientific and Cultural Organization. Governance: A ‘whole-of-society’ approach. March 2023.
- ² Intern discussiestuk zonder auteur. <https://www.google.com/search?client=firefox-b-d&q=activeren+opkomstplicht+praatstuk>. Praatstuk verkenning opkomstplicht, 30 oktober 2024.
- ³ Lasswell, “The garrison state”, 455–468.
- ⁴ Doorn, “The decline of the mass army in the West”, 147–158.
- ⁵ Schinkel, Vredesdivident: het afknijpen van Defensie leverde 134 miljard op. NRC <https://www.nrc.nl/nieuws/2024/02/15/vredesdivident-het-afknijpen-van-defensie-leverde-134-miljard-op-a4190070m> Accessed 4 Dec 2024.
- ⁶ Blokker and Schoof, Als Oekraïne zichzelf niet had verdedigd, zag Europa er nu heel anders uit. Jullie defensiebudget zou al op 6 procent liggen’ <https://www.nrc.nl/nieuws/2025/01/27/als-oekraïne-zichzelf-niet-had-verdedigd-zag-europa-er-nu-heel-anders-uit-jullie-defensiebudget-zou-al-op-6-procent-liggen-a4881049> NRC 28 februari. Accessed 2 Feb 2025.
- ⁷ Homan, “De nieuwe wereld(wan)orde”, 7–29.
- ⁸ Moelker et al., “From conscription to expeditionary armed forces”, 5–70.
- ⁹ Moelker et al., “From conscription to expeditionary armed forces”.
- ¹⁰ Meulen, ‘Civiel-Militaire betrekkingen’ [Civil-Military relations], 41–75.
- ¹¹ <https://www.google.com/search?client=firefox-b-d&q=activeren+opkomstplicht+praatstuk>. Praatstuk verkenning opkomstplicht, 30 oktober 2024. Intern discussiestuk zonder auteur.
- ¹² For 2030 the policy objective is set at 30 per cent. This percentage refers to the total of civilian personnel and servicewomen.
- ¹³ Official registration is lacking for privacy reasons. Ethnic minorities for example will not exceed a rough estimate of 5 per cent. 2017 is the latest year in which a percentage was published (4.7 per cent of personnel is of non-western origin) <https://www.kennisvandeoverheid.nl/cijfers-overheid/spersoneel/omvang-en-samenstelling-personeelsbestand>. We have no official numbers on sexual orientation.
- ¹⁴ Moelker et al., Rekruteren uit een diepere vijver. Een onderzoek naar de aantrekkelijkheid van de Defensieorganisatie, het rekruteringspotentieel en de belangstelling van de Nederlandse jeugd voor Defensie onder invloed van demografische ontwikkelingen. Breda, Research Paper 114.
- ¹⁵ Commissie Dienstplicht. Dienstplicht in Nederland: Rapport van de Commissie Dienstplicht. The Hague, 1992.
- ¹⁶ Moelker et al., *From Conscription to Expeditionary Armed Forces*; Ministerie van Defensie. 2024a. Stand van Defensie najaar 2024.
- ¹⁷ Ministerie van Defensie. 2024b. Stand van Defensie najaar 2024.
- ¹⁸ Rough estimate. The ‘real’ number varies according to definitions.
- ¹⁹ Under the condition of linear extrapolation. This condition is the most likely because economists know that technological innovation will not lead to a lessened demand for labour, but it will most likely heighten the demand for technologically schooled personnel (that is even more scarce than the ‘regular’ workforce). The MoD growing to 3 per cent of GDP would historically be a novelty (see Figure 11.1), but this is the percentage that the Secretary-General of NATO Rutte suggests as the future objective for Western European countries.
- ²⁰ Fouarge, D. and J. Bakens, De arbeidsmarkt naar opleiding en beroep tot 2026. Research Centre for Education and the Labour Market | ROA.

- ²¹ Maat, C. van der, Een dienmodel dat past bij een schaalbare krijgsmacht, Kamerstuk 36 124, nr. 45, 3 juni 2024.
- ²² According to Deputy Commander of the Armed Forces Vice Admiral Boots on 23-6-2022 in a speech for reservist organisation IDEA <https://www.defensie.nl/actueel/nieuws/2022/06/23/defensie-wil-veel-meer-reservisten-voor-schaalbare-krijgsmacht>, accessed 2 feb 2025.
- ²³ Berkhout, Met een 'vrijwillige dienstplicht' kan de krijgsmacht flink groeien, NRC, 14 April.
- ²⁴ Stand van zaken Defensie, voorjaar 2024.
- ²⁵ <https://werkenbijdefensie.nl/werkgeverstegemoetkoming>
- ²⁶ Source: Wikipedia.
- ²⁷ Sophia Besch and Katrine Westgaard, *Europe's conscription challenge: Lessons from Nordic and Baltic states*.
- ²⁸ Sophia Besch and Katrine Westgaard, *Europe's conscription challenge*.
- ²⁹ Difficult to translate The closest would be compulsory attendance. It means people are legally obliged to show up for screening after which they would be accepted/rejected for service. The 'opkomstplicht' is not activated but can be activated when the need arises. There will be a survey that informs and inquires whether or not 18-year-olds are interested in participating in the service year.
- ³⁰ Vuijsje, Wij waren geen soldaat. Het leger was voor losers.
- ³¹ We write "in *his* right mind", because not only were homosexuals excluded, but also women!
- ³² Stand van Defensie najaar 2024.
- ³³ Jonsson et al., "Multifaceted conscription", 19–33.
- ³⁴ Johnsson et al., "Multifaceted conscription".
- ³⁵ Noll, "Leadership and institutional reform in consensual democracies: Dutch and Swedish defence organizations after the Cold War".
- ³⁶ Doel, Opinie: Oorlog met Rusland vergt meer dan een noodpakket, Trouw, 6 December.
- ³⁷ The figure is generated in MapChart (<https://www.mapchart.net/europe.html>) by Johnson et al. (2024). The values used come from World Value Survey (2015, 2022), and national surveys from Norway, Estonia and Lithuania. Taken from Johnsson et al., "Multifaceted conscription".
- ³⁸ Urgency could change overnight. Developments in the security domain sometimes are dependent on events that happen. Developments in Washington DC, the Kremlin or Beijing might have unexpected consequences that cause a chain reaction. What happens in the Donbass or in Gaza (or elsewhere) might also have tremendous impact.

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Promising strategies for building societal resilience against hybrid warfare

Jeanette de Weert and Mark Levels

Abstract

A resilient general populace is not only a first line of defence against hybrid warfare, but also crucial for scaling military national defence strategies. This chapter provides insight into strategies that can build broad societal resilience against hybrid threats. We study four necessary conditions of resilient societies, i.e. social cohesion between citizens, psychological resilience, media literacy, and household preparedness. To map these conditions, we first provide an overview of recent scientific systematic literature reviews discussing interventions. Second, we present a case study on how Finland implemented a Whole-of-Society strategy. Third, we discuss the extent to which these policies can be implemented in the Netherlands.

Keywords: Whole of Society Approach; Hybrid warfare; Societal resilience.

Introduction

In an era marked by complex security challenges and increased volatility, an important question is how European countries can shore up their national security. This comes at a time where decades of peace and stability in Western Europe have led to complacency about national defence and a depletion of military capabilities across the continent. Consequently, many governments now resort to innovative strategies to enhance their national defences by designing scalable military forces. Such strategies can involve committing civilian resources to defence capacities. This so-called Whole of Society (henceforth: WoS) approach to national defence emphasises the mobilisation and integration of diverse societal actors – the military, other parts of government, private companies, civil society, and individual citizens – in tackling complex, large-scale challenges. Just like many other European countries, the Netherlands is currently exploring such WoS approaches to shore up its defences.¹

In a WoS approach, scalability of defences depends not only on countries' potential to scale up the military in response to threats, but also on the extent to which it is able to mobilise civilian resources necessary for national security. From that perspective, civil society is a crucial building block of any successful

WoS approach; but in many WoS strategies, relatively little attention is paid to the citizens that populate societies.² They are, however, of crucial importance: citizen resilience is a necessary precondition for scaling almost all other forms of national defence. The effect of citizen resilience on scalability of military force is quite direct. For example, mentally resilient and well-prepared citizens can aid national defence efforts by shoring up military forces as reservists or civilian personnel when military forces need to scale up. In this way, they can share the burden of national defence with armed forces in civilian roles, e.g., in fields of logistics or healthcare. Moreover, they can aid military efforts by not drawing away crucial resources from theatres of war, and by providing a stable home front to military personnel in the field. Thus, civil-military interaction is key to scaling defence as sufficient numbers of civilians need to be prepared, willing and able to effectively contribute to WoS, while unprepared citizens can hamper defence efforts, just as prepared citizens can help them.

The importance of building a resilient society for national security in the Netherlands stems from the two most plausible ways in which the country will be engaging with adversaries: through the commitment of military forces in aid of NATO allies, and through acts of hybrid warfare by adversarial states and terrorist organisations. Hybrid warfare targets denizens of adversarial states directly with a combination of military, economic, and cyber strategies, e.g., through direct action, through sabotage of critical infrastructure, through cyberattacks, through economic measures, or through influence campaigns.³ The latter is of crucial importance in a rather refined way: in open, democratic societies, societal support for military action is not a given; it is often ambiguous and open for debate. Social media give adversaries of Western countries effective means to directly influence citizens' beliefs, attitudes and opinions, and destabilise societies or undercut support for military engagement. As sustained societal support is required for long-term commitment of Western nations' military forces at scale, increasing citizens' resilience against undermining influencing campaigns or subversive actions is a key concept in WoS strategies.

In many Western countries, dimensions of societal resilience are demonstrably in need of serious improvement. For example, social cohesion has been in decline in many Western countries on almost all measurable scales.⁴ Similarly, household preparedness for disasters and war in EU countries remains insufficient despite increased public awareness campaigns.⁵ In this chapter, we therefore explore promising strategies on how the Netherlands can increase its societal resilience against military and hybrid threats. We argue that societal resilience against hybrid threats crucially depends on at least four dimensions: (a) social cohesion and trust, (b) psychological resilience, (c) media literacy, and (d) household preparedness. We then turn to two different types of evidence bases. First, we describe common findings from systematic reviews found in academic literature on effectiveness

of policies that could improve societal resilience. Second, we describe the way in which WoS strategies have been implemented in Finland.

Finland is commonly cited as a prime example of having a well-defined, operational WoS approach.⁶ It has a long and well-documented experience with implementing a WoS approach to security and defence. The Finnish Total Defence concept has evolved through the years into a broader understanding of security, namely the comprehensive security approach.⁷ Also, Finland is often referred to as a country which ranks high on all the four dimensions of societal resilience that are the subject of this research. This sounds promising for finding best practices of effective policies.

After building on the scientific literature and the Finnish case to describe what strategies are promising for increasing societal resilience, we assess which of those strategies can be implemented in the Netherlands. This is important because policies are embedded in specific contexts: a policy effective in a Nordic society may falter in another context. This is partly because of institutional differences. Cultural values also play a crucial role: individualistic policies may resonate in Western nations but face resistance in collectivist societies. Additionally, historical factors shape societal expectations and governance. Therefore, successful policy transfer requires understanding these distinctive elements to ensure effectiveness and sustainability in diverse environments.

What is societal resilience?

In general, societal resilience can be defined as the ability of societies to remain persistently functioning despite disrupting environmental changes. The concept is often invoked to discuss the extent to which societies' populations are capable of dealing with emergencies.⁸ Societal resilience is commonly viewed as an important line of defence against hybrid warfare; however, how to make societies resilient is still open for debate.⁹ A useful set of conditions for societal resilience was provided in the call to action to shore up Europe's defences by EU special envoy Niinisto as crucial for strengthening Europe's civilian and military preparedness and readiness.¹⁰ Explaining and elaborating on these conditions provide clear pathways for effective strategies that can be implemented at scale.

Four scalable conditions of societal resilience against hybrid warfare and military force

We focus on four crucial conditions for societal resilience relevant against emergencies caused by military force and hybrid warfare. First, strong societies

are cohesive.¹¹ Therefore, *social cohesion and trust* are important components of communities' resilience against adversities. High levels of social cohesion may encourage open dialogue, enable communities to discuss concerns, and develop unified responses to threats. This sense of belonging and mutual support can not only help to mitigate fear and anxiety but also empower individuals to act collectively, reinforcing national stability and security by ensuring a coordinated approach to facing hybrid challenges. We assume that societies with higher social cohesion and trust are more resilient against military force and hybrid warfare.

Second, *psychological resilience* is expected to strengthen individuals' capacity to withstand hardships.¹² Hybrid war and military force can provoke fear and discord. Psychological resilience supports individuals' ability to deal with adversity in a stable way, enhancing adaptive coping mechanisms that reduce panic and encourage effective crisis responses. Psychological resilience can enable people to cope with stress, uncertainty, and fear.¹³ For these reasons, we assume that the more psychologically resilient citizens are, the more resilient a society is against hybrid and military threats.

Third, *media literacy* can be a vaccine against mis- and disinformation – a common tactic in hybrid warfare. Media literacy interventions can empower individuals to critically analyse and discern information, reducing susceptibility to disinformation and propaganda.¹⁴ Educated, critically thinking individuals are more likely to verify sources, question sensational claims, and make informed decisions, which reduces the spread of misinformation within communities.¹⁵ By promoting media literacy through education and public awareness, societies can build a resilient, well-informed populace that supports national stability and security.¹⁶ We assume that the higher citizens' media literacy levels are, the more resilient societies are against propaganda and misinformation campaigns that are often an element of hybrid warfare.

The fourth dimension of societal resilience against emergencies caused by military force and hybrid warfare we explore is *household preparedness*, which may protect against various threats by equipping families with the knowledge and resources necessary to respond effectively to emergencies. Prepared households can mitigate the impact of disasters by having emergency plans, supplies, and communication strategies in place. This preparedness may foster a proactive mindset, enabling families to remain calm and organised during emergencies. Additionally, well-prepared households can support one another and share resources, enhancing community resilience.¹⁷ By cultivating preparedness, societies may be able to reduce vulnerability and increase resilience against hybrid threats.

Successful interventions

How to promote social cohesion?

The academic literature on effective policies suggests that increasing cohesion can indeed help communities fare through difficult times. Three types of policy interventions are noteworthy. First, interventions that *directly intervene in communities* to improve social cohesion. Such direct interventions are more likely effective if they succeed in increasing social capital in general, but also if they specifically focus on promoting contacts between groups.¹⁸ Particularly in multicultural contexts, fostering meaningful interactions and understanding between groups is crucial.¹⁹ To maximise effectiveness of community interventions, community members should be mobilised to identify the most important problems their communities grapple with, co-design interventions and participate in them. It also helps to build on community strengths to improve intervention effectiveness. Interventions should be strongly linked to scientific theories; their efficacy should be regularly tested with experimental designs and validated social cohesion measures.²⁰ Community-driven development programs are more effective if they mobilise entire communities, and not just a small, self-selected group of community members that volunteer to engage in such programs.²¹

The second type of intervention that seems promising aims to *actively shape the physical environment*. As public spaces provide opportunities for cultural activities and social interactions with people from different groups, physical environments matter.²² Some authors view designing the public sphere to promote social interactions as the single most promising strategy for improving social cohesion.²³ Access to destinations and walkability are positively related to social cohesion; population density appears to hinder social cohesion.²⁴ In cities, green places where people can meet can foster social cohesion, but safety, maintenance, and the sociocultural structures are crucial.²⁵ Effects are different for different ethnic groups and ages, and also depend on how safe people feel.²⁶ Third, *social media campaigns* may be effective in improving social cohesion. Social media can support close-knit, trustworthy networks of strong relationships in communities.²⁷ However, online social networking sites appear more likely to create new, weaker ties than to maintain or strengthen offline bonding relationships, which were typically sustained through other means. Social media and digital information and communication technologies can also promote neighbourhood social capital.²⁸

Creating psychologically resilient citizens

Psychological resilience can help people to deal with intense adversity.²⁹ Resilience is strongly shaped by individual characteristics and environmental contexts, and their interaction.³⁰ Psychological resilience is formed naturally in children that have normal connections with supportive and caring adults within the family and community, well-developed cognitive and self-regulation abilities, a positive self-image, and a strong motivation to engage effectively with the environment.³¹ Access to supportive relationships, opportunities to develop a strong sense of self, experiences that foster personal efficacy, exposure to social justice, access to essential resources such as food, education, and housing, a sense of cohesion within one's family, community, or school, and adherence to cultural values all contribute to building psychological resilience.³²

Societal circumstances that affect access also matter: economic circumstances or government policies that reduce access to essential services (e.g., childcare, social welfare, education, psychological support) can increase psychological vulnerability.³³ This evidence suggests that a *stable, cohesive and open society and access to sufficient economic resources* are crucial for building a psychologically resilient population, and that government can play a role increasing resilience by ensuring that the conditions for building it are met, even for the most vulnerable.

Our review sheds light on specific interventions that can further promote psychological resilience. It should be noted that the scientific evidence is not without conceptual and technical challenges³⁴ but still allows for some cautious conclusions.³⁵ For example, *training programs* may work. It is possible to actively train psychological resilience into people, both in the general populace³⁶ and in groups that are more likely to be at risk of experiencing trauma.³⁷ Successful interventions include mindfulness training and cognitive behavioural therapy.³⁸ Intervention effects appear relatively robust to the way they are delivered (e.g., individual or group sessions), although evidence suggests that self-help programs are less effective and the role of facilitators is crucial.³⁹ Longer, more intensive programs are most effective. For promoting resilience in children and adolescents, *school-based programs* can be very successful, particularly if they are delivered by teachers.⁴⁰ Although the evidence for policies promoting psychological resilience in adults is weaker, it points towards the conclusion that such policies may work.⁴¹ There is some evidence to suggest *work-place based interventions* have a positive effect, and also that *digital training* can be successful.⁴²

Improving citizens' media literacy

From the academic literature, we conclude that it is possible to improve media literacy through effective intervention programs, but results are mixed; programs that target identification of misinformation are generally successful, but those that aim at changing attitudes or beliefs are much less often effective.⁴³ Identification of disinformation alone is not sufficient; even when people evaluate information as non-credible, it can still influence their beliefs, attitudes, and behaviour.⁴⁴ The most important factor for success here is to start early. *School-based interventions that teach critical thinking* seem a promising long-term strategy to inoculate the population against disinformation.⁴⁵ Positive effects have been observed in preschool, primary and secondary education, higher education, and vocational schools.⁴⁶ Education programs emphasising reasoning, dialogue, and questioning (like problem-based learning), that require active participation and are tailored to the target group seem like promising strategies.⁴⁷

Preparing households for hardships

Our review reveals important strategies for improving household preparedness. However, it should be noted that the technical quality of scientific evidence on household preparedness for disasters is not very high and research designs often have serious flaws.⁴⁸ Nonetheless, we identify three promising strategies. First, *tailored information campaigns* can be effective, if they take into account that the effects of information are different for different people.⁴⁹ Individuals' personal traits like self-efficacy, perceived norms, preexisting beliefs, willingness to follow recommendations, and trust in the government significantly influence how different segments of the public perceive and interpret preventive messages. Such campaigns often fail to change preparedness behaviours when they are perceived as irrelevant, misaligned with household beliefs, use ineffective messaging, or fail to follow best practices for risk communication. Second, *school-based education programs* may work.⁵⁰ For example, implementation of disaster preparedness resources at scale can be done by means of promoting school programs through a combination of school-wide initiatives, support from local emergency management agencies, policy-based backing at the ministry level, and comprehensive teacher training. Third, *interventions based on community engagement techniques* can improve preparedness, with face-to-face approaches proving more consistently effective than mass media campaigns. Strategies to maximise success include employing a diverse range of strategies, prioritising face-to-face engagement that fosters community-led preparedness while accounting for implementation context and skill levels.⁵¹

It should be noted that effects of interventions on behavioural change are generally small. For example, household preparedness interventions that target social support, education, and behavioural modification interventions such as having go-bags and communication plans appear to not increase behaviour that increases household preparedness supplies and medications, with the possible exception of food and water supplies.⁵² Also, it is important to note that specific programs are required for groups that are relatively more at risk when disasters strike, like elderly people, disabled people, youth with health issues, or children.⁵³

Lessons from Finland: a case study

Finland is located in the Baltic sea area and shares a long border with Russia. Historically, Finland has been part of Sweden and from 1809 until 1917 of Russia. It declared its independence in 1917. Finland fought several wars with Russia (the Winter war in 1939–1940 and the Continuation war in 1941–1944). Finland kept its independency and avoided becoming a Soviet-republic, but lost several parts of its territory to Russia. This was endorsed in the Treaty of Paris in 1947. Since then, Finland has had to walk a tightrope in its relationship with its big neighbour. This ended with the dissolution of the Soviet-Union in 1991, but the current geopolitical security situation has resurrected this uneasy relationship.

Finland developed its Total Defence concept in the 20th century, especially during the Cold War, as a way to manage the security situation as a military non-aligned and neutral state. This strategic situation and the resulting sense of trust and shared purpose led to the notion of Total Defence.⁵⁴ Total Defence implies that conscription is integrated into a broader system of national comprehensive defence, which combines military forces with non-military capabilities and involves the active participation of the entire society.⁵⁵ Its aim is to deter potential aggressors by making the targeted state a challenging prospect. Finland has maintained both conscription and Total Defence planning throughout the post-Cold War period.⁵⁶ Total Defence can be thought of as a WoS approach. After the end of the Cold War, Finland started to broaden its conceptualisation of security towards a wider security concept describing security in terms of comprehensive security.⁵⁷ One of the reasons for this shift were the suggestions in the so-called “Hallberg Committee Report”, which said Total Defence could be criticised as militarisation of nations. Still, Total Defence is included in the comprehensive security concept.⁵⁸ Advantages of this shift are it contributed to dialogue and a broader approach towards preparedness planning, which contributes to countering hybrid threats. It is less a defence-oriented preparedness and more an all-hazards perspective which places central responsibility on the competent authority, placing all other

relevant security actors in supporting roles. As a result it provides more options for private companies and organisations to participate.⁵⁹ From 2013 the security focus returned to more antagonistic threats (i.e. hybrid threats, cyber threats), but Finland has continued to describe its understanding of security in terms of comprehensive security.⁶⁰ The case of Finland is illustrative of the transformation of the Total Defence system of the Cold War period into a comprehensive approach to security.

Valtonen et al. described the emergence of a Finnish “Comprehensive Security Model” (CSM). CSM is a governance model for how security should be addressed across societal and governmental levels, especially in an anticipatory fashion. The CSM is focused on coordination, a phenomenon-led approach, and firmly situated in the rule of law. The Finnish CSM must be seen in relation to broader Nordic notions of “societal security”. Societal security has clear consequences for society and its functioning, social institutions, civil society, and democracy.⁶¹ Wrangé et al. make a distinction between two different kinds of resilience: either in terms of the functioning of the government and society (which they refer to as state resilience) or as a population’s ability to withstand various challenges and resist external manipulation (which they refer to as societal resilience). They argue Finland’s understanding of resilience over the years has tilted towards societal resilience.⁶²

Finland invests heavily in a whole-of-government approach in which ministries are encouraged to work cross-government. Finland has a bureaucratic model with distinct responsibilities for different domestic actors. In Finland, the ministries have an operative role to play, and the ministers thus become both political leaders and responsible for the implementation of different initiatives. The Finnish approach involves cooperation between the public administration; for example, there is a Head of Preparedness in each ministry, the business community, nongovernmental organisations (NGOs), and the EU and NATO.⁶³ Next to this it has resulted in the creation of the Security Committee, where ministries, agencies, the President’s office, NGOs, and business organisations coordinate comprehensive defence. While the security committee staff is employed by the Ministry of Defence, the committee still has an independent coordinating role to play.⁶⁴ Another example is the Finnish behavioural policy in government (FINBEPOL). The Security Strategy for Society defines seven functions vital for Finland’s society. The functions are: Psychological resilience; Functional capacity of the population and services; International and EU activities; Defence capability; Internal security; Economy, infrastructure and security of supply; and Leadership.⁶⁵ These functions are essential for society to be prepared for different crisis situations. The vital functions cover all major aspects of social life that are the responsibilities of the government and the relevant ministries.⁶⁶

Promoting social cohesion

Finland is a small and largely homogenous country: it has a population of about 5.6 million, with 90.9% of the population of Finnish descent (2022 est.).⁶⁷ One key factor in maintaining social cohesion is that the country has a well-functioning society. On many indicators of societal success, Finland ranks at or near the top. Finland can boast relatively high happiness levels, press freedom, media trust, gender equality, social justice and transparency, a low perception of corruption and a world class education system.⁶⁸ In general, the high quality of life makes it difficult for external actors to find fissures within society to crowbar open and exploit.⁶⁹

The literature points towards three main success factors. First, the high social cohesion appears to reflect that the *public institutions in Finland generally function well*. For example, the Fins believe that trust is built during normal conditions. Thus, the Finnish authorities strive to retain this trust by observing the same principles and values under all conditions; normal, incidents or emergencies.⁷⁰ Second, a *successful transdisciplinary approach towards intervention policies*. For example, the country has adopted a cross-sectoral approach for involving people in public administration activities and decision-making and improved cooperation with the scientific community.⁷¹ Understanding the necessity of comprehensive thinking among politicians and key leaders from every vital branch is supported via National Defence Courses.⁷²

In 2016 and 2017 the universities of Vaasa, Tampere, and the National Defence University ran a research project on civic society's role in a country's defence using the Security Café method. This is a deliberation and data collection method developed for security authorities and researchers to access the opinion of the general public on issues of importance to their safety and security. The model is one example of how deliberation could be implemented also in the domains of safety and security.⁷³ Such activities bring stakeholders from various relevant parts of society together to work on security-related issues. Third, *active policies aimed at strengthening society*. The European Union recognises that the social domain and culture are two important target domains for hybrid threats.⁷⁴ Finland recognises this and invests in policies which strengthen sources of sociocultural cleavages such as unemployment, integration, inclusion of vulnerable groups, poverty, equal treatment across generations and education.⁷⁵ FINBEPOL's annual report 2022–2024 mentions a good-relations policy which aims to influence people's attitudes, foster inclusion and strengthen their sense of safety by increasing interaction between different groups of people. This is particularly important in policies related to integration and exclusion.⁷⁶

Creating psychologically resilient citizens

Finland is considered one of the countries with a relatively high willingness to fight. There are at least two reasons for this. First, the threat perception of the Finns is high due to the fact they are neighbouring Russia and have fought wars with Russia in the past. Second, there is a strong cultural norm towards psychological resilience. Psychological resilience is identified by Finland as one of the seven vital functions for society. Creating and maintaining psychological resilience is a long-standing and cross-cutting effort involving different administrative branches.⁷⁷ Finland distinguishes between three dimensions of psychological resilience, normal conditions, operational capability during crisis, and operational capability during recovery.⁷⁸ It actively tries to train psychological resilience into its population. For example, psychological resilience is one of the government's priority policy areas for behavioural policies. Such policies emphasise the vital role of communication for psychological resilience and link psychological resilience to community resilience. In its annual report the responsible government agency FINBEPOL gives three actionable recommendations for strengthening psychological resilience: the fear of stigma associated with preparedness is alleviated. This suits better with the flow of the other two sentences; the understanding of the different dimensions of preparedness should be strengthened (this includes recognition of incomplete and misinformation, and data safety); and communication of public authorities should contain clear recommendations for action. FINBEPOL has been involved in developing psychological resilience research tools, mapping the current state of play as part of overall safety, preparing reports and discussion papers on the topic, and holding lectures on the topic on national defence courses since 2023.⁷⁹

It probably helps that psychological resilience is deeply ingrained in Finnish culture. The Finnish cultural construct of 'sisu'⁸⁰ is held by Finns to express their national character and complemented with the experience of the wars with Russia strengthens their will to fight. It is a central part of Finnish collective discourse and can be seen as a life philosophy. Emilia Lahti conducted a study which introduced the Finnish cultural construct of 'sisu'. Ultimately, three key themes were identified: extraordinary perseverance, action mindset, and latent power.⁸¹

Improving citizen's media literacy

Finland maintains a relatively small media market and a fairly concentrated media system, but the news media are diverse, including a strong public broadcaster that has almost half of both TV and radio audiences, some privately owned domestic broadcasters, an increasing number of online news outlets, and many regional and local newspapers. Media content is available in the Swedish and Sámi minority

languages.⁸² And as trust in the media has waned in other parts of the globe, Finland has maintained a strong regional press and a strong public broadcaster. According to the Reuters Institute Digital News Report 2018, Finland tops the charts for media trust, which means its citizens are less likely to turn to alternative sources for news.⁸³

Strong media literacy has been identified as one way Finland has successfully resisted disinformation. According to the Media Literacy Index, Finland continues to be one of the highest ranking countries, in first place in 2018 and 2022.⁸⁴ Next to this, Finland is deemed to be the “least susceptible to fake news”.⁸⁵

Finland’s government considers the strong public education system as a main tool to resist information warfare. Widespread critical thinking skills among the Finnish population and a coherent government response are thought to be key elements.⁸⁶ Development of critical thinking skills starts early through the educational system. Finland ranked fourth in Europe in 2022 for the PISA score for reading performance in the EU.⁸⁷ Next to this, the Finnish Institute of Internal Affairs (FIIA) advises awareness-raising campaigns. Possible target individuals, such as academics, decision-makers and company executives need to be made aware of the possible methods through which they may be approached.⁸⁸ FINBEPOL participates in a project for strengthening society’s capacity to better understand the risk of mis-, dis- and malformation, and to identify ways to prevent the harms of false information. This is seen as a civic skill.⁸⁹ Another approach is actively promoting resilience for critical infrastructure and seeking to counter disinformation campaigns online, especially Russian-backed propaganda on social media.⁹⁰ For example, in an attempt to counter disinformation Finland developed a strong national narrative, rather than trying to debunk false claims. Jed Willard⁹¹ told CNN in an interview: “The Finns have a very unique and special strength in that they know who they are. And who they are is directly rooted in human rights and the rule of law, in a lot of things that Russia, right now, is not. There is a strong sense of what it means to be Finnish ... that is a super power.”⁹²

Preparing households for hardships

Historically, Finland puts a lot of emphasis on home preparedness. Among all of the Nordic countries they are the country which has invested most in the practice of stockpiling resources and putting effort into the insurance of supply lines.⁹³

There is a variety of educational programmes on the subject of preparedness available. These differentiate between social groups, for example youths. A generic website as well as a separate website specifically focussed on youth is maintained by the Finnish National Rescue Association (SPEK).⁹⁴ In November 2024 the Ministry of the Interior together with the Digital and Population Data Services Agency, and the authorities and organisations involved in preparedness and operational capability such as SPEK and the National Emergency Supply Agency (NESA) launched

a programme for household preparedness. They provide online services and websites, such as the Suomi.fi and 72hours.fi service where you can find the ‘72 hour – can you cope on your own’ guide and brochure.⁹⁵ The new preparedness guide brings information and instructions from various organisations together in one place and is available in 15 different languages. In addition, a training system has been designed consisting of public presentations and webinars given by 72-hour instructors. The advantage of this is that all information on different subjects and from different organisations is gathered in one place and in one document.

Conclusions and discussion – adopting Finnish best practices in the Netherlands?

According to the Dutch government, a “solid, resilient society can withstand shocks – regardless of what comes our way. It is a society in which the government, public and private partners, civil society organisations, knowledge institutions, and citizens are as prepared as possible for social disruption and have the capacity to resist, absorb, and recover from it.”⁹⁶ To build a resilient society requires learning from best practices and understanding what works. In this chapter, we explored how Finland succeeds in mobilising the whole of Finnish society, and discussed academic literature that can point towards practical policy interventions that are proven effective in increasing elements of societal resilience.

The question remains how applicable these lessons are to improve societal resilience in the Netherlands. Finland, sharing a long border with Russia, has historically faced direct security threats, shaping a strong national defence culture. The Netherlands, while not bordering a major military adversary, plays a crucial role as a logistical hub, with key infrastructure such as the ports of Rotterdam, Vlissingen, and Eemshaven. This makes the country a potential target in geopolitical conflicts, particularly as a Host Nation Support (HNS) location for allied forces in case of military deployment. However, this strategic vulnerability is not yet widely recognised by the Dutch population. Raising public awareness and fostering a stronger security culture may therefore be necessary.

The Finnish approach to national security offers valuable insights for strengthening societal resilience. A key factor is trust, both in institutions – such as government and media – and among citizens. High levels of trust facilitate effective crisis response and strengthen societal cohesion. Closely related is the role of social cohesion in reducing polarisation and enhancing collective resilience. Finland’s welfare state, inclusive policies, and attention to minority and vulnerable groups contribute to societal stability. It also acknowledges the importance of media, democracy, and the rule of law, with a particular focus on young people and vulnerable populations.

All these elements are also key in Dutch policies, but the extent to which they can be effectively implemented in the Netherlands remains to be seen.

There are at least three important challenges. First, the academic literature and the Finnish case study both point towards investing in resilience in normal times. In Finland, this comes from the realisation that non-peace is the normal state of being. Rather than preparing for crises only when they occur, Finland maintains constant readiness. In Finland, coordination structures, legislation, and communication protocols remain consistent in both normal and emergency conditions. It also actively builds the foundations for resilience by securing government functioning, by promoting social cohesion, by safeguarding pluralistic and high-quality media, and, crucially, by educating youth about relevant topics already in school. In the Netherlands, strategies to promote social cohesion are not explicitly part of the WoS approach. They should be. Also, while engaging young people is key to the Dutch approach to WoS, relatively little attention is paid to the important role education plays in education and preparing youth. As both the Finnish WoS strategy and the academic literature underline the importance of education for almost all dimensions of societal resilience, the Dutch WoS approach should include education as a tool for promoting resilience.

This may be related to the second major challenge. Finland has a comprehensive view on security and defence and its security strategies take into account a broad spectrum of different crises and disasters. In contrast, the Dutch government is more limited and focusses mostly on resilience against military and hybrid threats. This makes it more difficult for other stakeholders to get involved, or feel invited to make an effort. A comprehensive security approach that addresses a wide range of threats – not just military and hybrid risks – ensures broader recognition and engagement from non-military actors. This inclusivity makes security efforts more accessible to society as a whole and helps prevent the militarisation of national security. Active citizen engagement is certainly possible. For example, Finland's security cafés can serve as a model for involving the public in security discussions, resembling recent Dutch initiatives such as the National Citizens' Assembly on Climate (OFL). They might also help in raising awareness among Dutch citizens about vulnerabilities and threats.

Third, the Finnish WoS policies are strongly institutionally and culturally embedded and therefore not easily transferable to other countries. For example, the Dutch do not have "sisu". Also, the Finns have a long tradition involving a broad spectrum of different societal groups, and put a lot of emphasis on cooperation and consulting between different institutions and organisations such as government, education/academic, research, civil society, different societal groups, businesses, and NGOs. Finland has installed a number of services/committees which have a relation with societal resilience. Next to this, the government has several ministries

and offices which produce resolutions, policies, publications, reports and conduct regular surveys and programmes on subjects that relate to the factors of societal resilience. The government started to apply behavioural science in public administration in autumn 2020 and implemented this approach further in the Finnish behavioural policy in government.⁹⁷ The European Centre of Excellence for countering hybrid threats was established in Helsinki at Finland's initiative.⁹⁸

The insights from the academic literature point towards general strategies the Netherlands can implement to effectively improve societal resilience, e.g., by improving household preparedness or increasing media literacy. Although this scientific evidence stems from overviews of empirical tests done in different national contexts, intervention efficacy is generally context dependent. It is therefore advisable to test effectiveness on a limited scale and scale up effective interventions in an evidence-informed way. This is even more important because the scientific evidence on what works is regularly plagued by quality issues.

Notes

- ¹ Tweede Kamer der Staten-Generaal, "Weerbaarheid tegen militaire en hybride dreigingen".
- ² Finnish government, *Inclusive and competent Finland*, 33; NATO, Committee on Democracy and Security Resolution 466: "Developing a Whole-of-Society".
- ³ Bradshaw and Howard, *Troops, trolls, and troublemakers*; Elonheimo, "Comprehensive security approach", 113–137.
- ⁴ Putnam, Feldstein and Cohen, *Better together*; Valgarðsson et al., "A crisis of political trust?".
- ⁵ Filippopolitis et al., "A survey on emergency preparedness of EU citizens".
- ⁶ Tweede Kamer der Staten-Generaal, "Weerbaarheid".
- ⁷ Berzina, "From 'total' to 'comprehensive' national defence", 5–6.
- ⁸ Schäfer et al., "A systematic review of individual, social, and societal resilience factors", 92; Keck and Sakdapolrak. "What is social resilience?", 5–19.
- ⁹ Apostol, Cristache and Năstase, "Societal resilience", 107–115; Nikolov, "Building societal resilience against hybrid threats", 91–109; Wigell, Mikkola and Juntunen, *Best practices*.
- ¹⁰ Niinisto, *Safer together*.
- ¹¹ Rothstein and Stolle, "The state and social capital".
- ¹² Bonanno, "Loss, trauma, and human resilience", 20–28.
- ¹³ Southwick et al., "Resilience definitions, theory, and challenges"; Masten and Narayan, "Child development".
- ¹⁴ Guess et al., "A digital media literacy intervention", 15536–15545.
- ¹⁵ Dame Adjin-Tettey, "Combating fake news, disinformation, and misinformation".
- ¹⁶ McDougall, "Media literacy versus fake news".
- ¹⁷ Levac, Toal-Sullivan and O'Sullivan, "Household emergency preparedness", 725–733.
- ¹⁸ Banas, Bessarabova and Massey, "Meta-analysis on mediated contact and prejudice"; Paolini et al., "Intergroup contact research in the 21st century"; Paluck and Green, "Prejudice reduction".

- ¹⁹ Moleka, "Redefining social cohesion".
- ²⁰ Orazani, Reynolds and Osborne. "What works and why in interventions to strengthen social cohesion".
- ²¹ White et al., *Community-driven development*.
- ²² Qi, Mazumdar and Vasconcel, "Understanding the relationship between urban public space and social cohesion".
- ²³ Ramos-Vidal and Domínguez de la Ossa, "A systematic review to determine the role of public space and urban design on sense of community".
- ²⁴ Mazumdar et al., "The built environment and social capital".
- ²⁵ Clarke et al., "Factors that enhance or hinder social cohesion in urban greenspaces".
- ²⁶ Qi, Mazumdar and Vasconcel, "Urban public space and cohesion".
- ²⁷ Williams, "The use of online social networking sites to nurture and cultivate bonding social capital".
- ²⁸ Üblacker et al., "Catalysts of connection".
- ²⁹ PeConga et al., "Resilience is spreading".
- ³⁰ Ungar, ed., *Multisystemic resilience*.
- ³¹ Masten, *Resilience in development*.
- ³² Masten, "Family risk and resilience", 1748; Ungar et al., "Unique pathways to resilience across cultures"; Schäfer et al., "A systematic review".
- ³³ Willms, "The prevalence of vulnerable children", 45–70.
- ³⁴ Fox et al., "A systematic review of interventions to foster physician resilience"; Leppin et al., "The efficacy of resiliency training programs".
- ³⁵ Macedo et al., "Building resilience for future adversity", 1–8.
- ³⁶ Liu et al., "The pursuit of resilience", 1–21; Dray et al., "Universal resilience-focused interventions".
- ³⁷ Cleary et al., "The effectiveness of interventions".
- ³⁸ Joyce et al., "Road to resilience"; Liu and Noh, "The effectiveness and applicability of mindfulness intervention".
- ³⁹ Lui et al., "The pursuit"; Cleary et al., "The effectiveness".
- ⁴⁰ Dray et al., "Systematic review".
- ⁴¹ Macedo et al., "Building resilience", 1–8.
- ⁴² Robertson et al., "Resilience training in the workplace"; Ang et al., "Digital training for building resilience".
- ⁴³ Droog et al., "Combatting the misinformation crisis".
- ⁴⁴ Droog et al., "Combatting the misinformation crisis".
- ⁴⁵ Machete and Turpin, "The use of critical thinking", 235–46.
- ⁴⁶ O'Reilly et al., "Critical thinking in the preschool classroom"; Kurz et al. "School-based interventions improve body image and media literacy in youth"; Puig "A systematic review on critical thinking intervention studies"; Tommasi, "Enhancing critical thinking skills", 239–257.
- ⁴⁷ Anggraeni et al., "Problem-based learning research"; Martinez et al., *Analysing intervention programmes*.
- ⁴⁸ Amberson et al., "Social support, educational, and behavioral modification interventions"; Forsyth et al., "Conceptualizing risk communication barriers".
- ⁴⁹ Savoia et al., "Communications in public health emergency preparedness".
- ⁵⁰ Ronan et al., "Disaster preparedness for children and families".
- ⁵¹ Ryan et al., "Community engagement for disaster preparedness".
- ⁵² Amberson et al., "Social support".
- ⁵³ Beltran et al., "Rising above the flood"; Griffin et al., "Home-based emergency preparedness"; Ronan et al., "Disaster preparedness".

- ⁵⁴ Wrangé, Bengtsson and Brommesson, “Resilience through total defence”, 7.
- ⁵⁵ Berzina, “From ‘total’ to ‘comprehensive’”.
- ⁵⁶ Wrangé, Bengtsson, and Brommesson, “Resilience through total defence”, 7.
- ⁵⁷ Berzina, “From ‘total’ to ‘comprehensive’”.
- ⁵⁸ Prime Minister’s office, *Preparedness and comprehensive security committee report*.
- ⁵⁹ Valtonen and Branders, “Tracing the Finnish comprehensive security model”, 100–101.
- ⁶⁰ Wrangé, Bengtsson, and Brommesson, “Resilience through total defence”, 8.
- ⁶¹ Valtonen and Branders, “Tracing the Finnish comprehensive security model”, 91–92.
- ⁶² Wrangé, Bengtsson, and Brommesson, “Resilience through total defence”, 9.
- ⁶³ Nicholson et al., *Defence mobilisation planning*, 25.
- ⁶⁴ Wrangé, Bengtsson, and Brommesson, “Resilience through total defence”, 11–12.
- ⁶⁵ Berzina, “From ‘total’ to ‘comprehensive’”.
- ⁶⁶ Security Committee Report, *The security strategy for society*.
- ⁶⁷ CIA, “The world factbook”.
- ⁶⁸ Helliwell et al., *World happiness report 2024*; Reporters Without Borders (RSF), “World press freedom index”; Reuters Institute for the Study of Journalism, *Digital news report 2024*; World economic forum, *Global gender gap report 2024 Insight report*; Thorsten Hellmann et al., *The social justice in the EU and OECD index report 2019*; Transparency International, *Corruption perceptions index 2023*; OECD, *PISA 2022*, 44.
- ⁶⁹ Mackintosh, “Finland is winning the war on fake news”.
- ⁷⁰ Security Committee Report, *Security strategy*, 22.
- ⁷¹ Mikael Wigell, et al., *Nordic resilience*, 41–42.
- ⁷² Valtonen and Branders, “Tracing the Finnish comprehensive security model”, 102.
- ⁷³ Puustinen, Raisio and Valtonen, “Security cafés”, 31–30.
- ⁷⁴ Giannopoulos, Smith and Theocharidou, *The landscape of hybrid threats*.
- ⁷⁵ Finnish government, *Inclusive and competent Finland*.
- ⁷⁶ Prime Minister’s office, *FINBEPOL, annual report 2022–2024*, 31.
- ⁷⁷ Security Committee Report, *Security strategy*; FINBEPOL, *annual report*.
- ⁷⁸ Security Committee Report, *Security strategy*, 24.
- ⁷⁹ FINBEPOL, *annual report*, 19–20.
- ⁸⁰ *Sisu* translates best as stoic determination, resilience, bravery, or hardiness.
- ⁸¹ Lahti, “Embodied fortitude”, 61–82.
- ⁸² RSF, World press freedom index.
- ⁸³ Mackintosh, “Finland is winning”.
- ⁸⁴ Lessenski, *Common sense wanted*; Lessenski, *Media literacy index 2022*.
- ⁸⁵ Burda, *Cognitive warfare*, 11.
- ⁸⁶ Lessenski, *Media literacy index 2022*.
- ⁸⁷ The global Economy.com (website).
- ⁸⁸ Finnish Institute of International Affairs (FIIA), *Geostrategically motivated co-option of social media*.
- ⁸⁹ FINBEPOL, *annual report*, 35.
- ⁹⁰ Black, Kleberg and Silfversten, *NATO enlargement amidst Russia’s war in Ukraine*.
- ⁹¹ Director of the Franklin Delano Roosevelt Center for Global Engagement at Harvard University.
- ⁹² Mackintosh, “Finland is winning”.
- ⁹³ Wigell et al., *Nordic resilience*, 20, 50–51.
- ⁹⁴ The Finnish National Rescue Association (SPEK) (website), <https://www.spek.fi/en/safety/>; SPEK youth preparedness website (in Finnish), <https://www.spek.fi/nuorten-varautumissivusto/>.

- ⁹⁵ SPEK (website), "Instructions for preparing for incidents and crises have been compiled in the Suomi.fi online service", 2024, <https://www.spek.fi/en/instructions-for-preparing-for-incidents-and-crises-have-been-compiled-in-the-suomi-fi-online-service/>; 72 Hours (website), <https://72tuntia.fi/en/>.
- ⁹⁶ Tweede Kamer der Staten-Generaal, "Weerbaarheid".
- ⁹⁷ FINBEPOL, *annual report*.
- ⁹⁸ Finnish Government, *Finnish foreign and security policy*, 27.

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Exploring grassroots knowledge production: Towards internal crowdsourcing for military intelligence

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Abstract

Military intelligence organisations face a dynamic security environment. While leveraging external public knowledge is often explored, this chapter highlights the untapped potential of internal knowledge within the broader defence community. Internal crowdsourcing – gathering ideas and solutions from volunteering employees – can harness tacit expertise and enhance the capability of knowledge and intelligence production. Using primary sources and interviews, the chapter examines grassroots knowledge production initiatives within the Dutch Defence organisation as a foundation for internal crowdsourcing. These initiatives demonstrate that scaling knowledge production requires recognising and fostering grassroots efforts. Supporting collaboration while preserving hidden local ingenuity enables innovative, scalable approaches to military intelligence practices, creatively addressing complex and ambiguous challenges.

Keywords: Internal crowdsourcing; Scalability; Local ingenuity

Introduction: scaling knowledge production

In the context of unprecedented complexity in global security, today's increasingly digital information environment, and the hybrid nature of present-day armed conflicts, military intelligence organisations have to look beyond traditional strategies and practices of knowledge production. One way to adapt to this fast-changing threat landscape is to improve the scalability of knowledge production in intelligence organisations. In this chapter, scalability is approached as an organisational capability that facilitates the overall scaling process of organisations. Scaling is understood as an organisational process whereby managers transform the internal organisation and leverage digital resources to expand an organisation's output without a corresponding ex-ante increase in inputs.¹ Instead of a sole focus on growth (e.g., more employees, more hardware) it is focused on finding coherence among an organisation's technological and organisational architecture,

and business model, while taking legal frameworks into account. With regards to knowledge production, improving the scalability means adapting knowledge production processes to handle increasing volumes of data, participants, or challenges.

While the sourcing of publicly available information and knowledge among ‘external’ public think tanks, investigative journalism organisations, or groups of volunteering citizens is explored,² leveraging ‘internal’ knowledge within the defence organisation seems to have been overlooked. In the Netherlands, the recent war in Ukraine and Russia has further stimulated individual military and security professionals to gather publicly available information to make sense of developments. These often were grassroots initiatives, driven by a sense of urgency, a perceived knowledge gap or informal requests from intelligence officers or knowledge centres. Larger coordinated ‘top-down’ efforts to engage with these grassroots initiatives remain absent. This might be caused by a lack of understanding about what type of information is implicitly available, or difficulties with gaining an overview and managing the great variety of information. Depending on the quality and type of information, value for the organisation can potentially either be derived from individual pieces or from aggregation (e.g., synthesis of heterogeneous collected data).³ Recognising the available military expertise and knowledge on Russia enables facilitating and harvesting grassroots knowledge production within the broader defence organisation. The Dutch Defence Intelligence and Security Service (DISS) and military intelligence units could potentially scale their intelligence practices, bridging the gap between support for military and defence operations at the strategic level and intelligence efforts that focus on tactical and operational levels.^{4,5}

Based on primary sources and interviews with eight stakeholders within the Dutch Defence organisation, this chapter explores grassroots knowledge production initiatives in more detail, to identify what caused the initiatives, assess how the knowledge is produced and used, and how it all (indirectly) relates to military intelligence practices. It then proceeds to discuss how this fits with, or provides fertile ground for, internal crowdsourcing and connects to the armed forces’ existing hierarchical structures, processes and mindset of the leadership. As such, the overall aim is to better understand the phenomenon of grassroots knowledge production initiatives and how it can support the scaling of military intelligence practices.

Ideal internal crowdsourcing and grassroots local ingenuity

In general, crowdsourcing refers to a problem solving and knowledge production model that leverages the collective intelligence of online communities for specific purposes set forth by a crowdsourcing organisation.⁶ In terms of directed knowledge

production, it is first important to clarify the distinction between ‘internal’ and ‘external’ crowdsourcing. In business management and information systems literature, internal crowdsourcing is distinguished from both hierarchy-based work with employees, and from involving external crowds and independent ‘end users’.⁷ Internal crowdsourcing is referred to as ‘the firm extending its problem-solving to a large and diverse group of self-selected contributors beyond the formal internal boundaries of a large firm; across business divisions, bridging geographic locations, levelling hierarchical structures’.⁸ From an information systems perspective, Zuchowski et al. define internal crowdsourcing as ‘an (a) IT-enabled (b) group activity based on an (c) open call for participation (d) in an enterprise’.⁹ This description captures two general, but essential elements. First, participation and interaction is facilitated by new types of communication channels and digital workspaces and is generally seen as an online activity. Second, as with hierarchical work and external crowdsourcing, internal crowdsourcing involves a type of direction and organisation. However, studies on crowdsourcing also emphasise the open character of requests and voluntary participants, who contribute their knowledge and experience and receive a form of satisfaction in return.¹⁰ The overall goal is to leverage information present in the broader organisation to increase its flexibility and agility – in service of the organisation producing for an external client.¹¹

What complicates matters in the case of defence and military intelligence, is the complex relation and overlap between intelligence producers, and the consumers or clients.¹² Military units use intelligence to train and prepare for operations, while these units also function as sensors and collect (publicly available) information in the field. Intelligence staff at different hierarchical levels process this information and report it up the intelligence chain of command and network. The relationship between defence intelligence agencies, military intelligence branches and operational units can thus perhaps best be ‘re-conceptualized as a network of intelligence prosumers working with each other to reach a common goal’.¹³ While they differ in their specific scope and aims, they are all confronted with the same security context, threats and challenges. Therefore, they can have something to offer to others. It has led to various suggestions by scholars to improve organisations, such as creating a joint intelligence command, and cross-functional intelligence teams.^{14,15}

However, what has been missing thus far in the debate are the more bottom-up oriented perspectives. Given the more complex multi-way relationships within the defence organisation, grassroots initiatives by servicemen to collect a diverse range of public information – individually or in small groups – could constitute an important supplement to internal crowdsourcing. Within the Netherlands armed forces, in the last two years grassroots initiatives have become visible aimed at understanding the war in Ukraine and Russian military doctrine. The output of at least two of those has been transformed into institutional ‘forms’ or products, like formal briefings for

Defence Intelligence and Army commanders, official handbooks and publications, and a new knowledge centre. These manifested because of the servicemen's own initiative, sometimes (eventually) facilitated in terms of working hours, office space or IT infrastructure by military commanders. One might wonder to what extent the initiatives merely represent the tip of the iceberg, with numerous grassroots knowledge production initiatives remaining hidden or abandoned due to organisational barriers and current stringent data protection regulations. Internal crowdsourcing requires moving beyond hierarchical approaches (e.g., procedures, protocols and principles), often entrenched in military culture.¹⁶ The prevailing top-down, rational perspective on regulations problematises many of the informal knowledge production practices, as the systematic collection and processing of personal data for sensemaking in support of military operations often lacks a clear legal foundation.¹⁷ A rational perspective might deem particular knowledge production practices within the organisation 'out of order' or impermissible. From a constructivist perspective it becomes foregrounded how organisational goals and frameworks can conflict.¹⁸ In that sense, private informal knowledge production routines by servicemen can be viewed as a form of 'local ingenuity' to mitigate conflicts between the urgent need for sensemaking and limited organisational capabilities and possibilities.

This chapter does not advocate the circumvention of existing legislation, but aims to emphasise how recognising and facilitating grassroots knowledge production initiatives could stimulate further innovation and allow for managing potential risks such as biases, the overall quality of the process, or IT security issues. Regarding the domain of flight safety, studies have shown how providing employees with freedom and opportunities for self-organisation have been a critical factor for enhancing competitiveness and improving the armed forces' operational readiness.¹⁹ This chapter projects and translates these insights to knowledge production.

Information, intelligence and knowledge

Debate in intelligence studies on the nature of 'intelligence' is ongoing, oftentimes referring to Russell Ackoff's DIKW categorisation, or 'hierarchy' (with the additional W representing 'wisdom').²⁰ Some critical interpretations problematise this framework, highlighting the situatedness of the selection of 'raw' data, or knowledge production.^{21,22} More than a strict hierarchy, DIKW can be thought of as a spectrum where a process of transformation occurs of physical, cognitive and sociocultural belief structuring.²³ What distinguishes 'general' data, information and knowledge from intelligence, is its relevance for a specific consumer, its timeliness and actionability, the processing and evaluation of reliability of the information and the source(s), and its exclusive and shielded (or secret) nature.²⁴ A further distinction

in the military domain is that defence intelligence is more strategically oriented on long-term developments, while military intelligence is often focussed on the current operational environment. Yet in practice, what distinguishes intelligence from other forms of knowledge can be quite ambiguous.

Parallel to intelligence, various knowledge centres (KCs) exist in NATO armed forces that seek to support professional military education and training. These also seek to make sense of current developments and trends in warfighting, for example by identifying lessons on the war in Ukraine and Russian military action. As such, NATO and national knowledge management strategies seek to facilitate the efficient gathering, processing, storing and sharing of available knowledge. Key challenges remain in ensuring that knowledge is effectively captured, evaluated and utilised across diverse operational contexts.²⁵

Thus, various forms of grassroots collection initiatives and internal crowd-sourcing can generate different types of data, information and knowledge, as input for military intelligence *and* knowledge centres. Moreover, the case study discussed in the next section even demonstrates how informal initiatives led to formal briefings and the publishing of official doctrinal handbooks, and also the institutionalisation of an informal network into a recognised ‘think tank’, and the establishment of a knowledge centre.

Formalising the informal?

The context

The war in Ukraine underscores the urgency for intelligence analysis and knowledge production across various levels in the Defence organisation. Strategic intelligence flows through policy departments and armed forces intelligence units, while Lessons Learned units report on key implications of the changing character of war. Knowledge centres publish bulletins and revised doctrines on Russian military units, and public experts provide lectures and awareness briefings to armed forces units and at training facilities on the new security reality. Through a growing – albeit stovepiped – international military network, relevant information, knowledge and intelligence is shared among countries supporting Ukraine. However, what does not become clear immediately perhaps, is how these forms of sensemaking are infused by informal and grassroots knowledge production practices. Publicly available data and information finds its way into institutional products, often then becoming classified to different degrees.

Yet, while the value of timely open-source information is widely acknowledged, a previous scandal continues to cast a shadow over the Dutch Defence organisation.

On 15 January 2023, journalists reported on the Land Information Manoeuvre Centre (LIMC), an Army unit collecting public information, containing personal data, without a legal basis.²⁶ While aimed at supporting COVID-19 policy and decision making in the Netherlands, a thorough evaluation concluded the Army had effectively operated without a proper mandate.²⁷ Under a separate law, intelligence services can collect public data, or open source intelligence (OSINT), a foundation currently lacking for the armed forces. It has made military commanders and managers hesitant to allow or facilitate servicemen to collect public information, even when necessary for raising awareness and understanding in support of performing their duties.

Influenced by the imbalance between ambition, legal mandate, and available capacity during preparation processes, a new Armed Forces Act is under construction. The law aims to create more flexibility for the armed forces by simplifying and accelerating procedures or by temporarily and incidentally allowing more.²⁸ While this proposal could have a positive effect on grassroots knowledge production initiatives, it is likely that the conflicting goals of sensemaking and checks and balances will still lead to informal and grassroots knowledge production practices. These practices exist hidden from the view of many managers, consequently with less professional feedback or institutional learning mechanisms. To increase understanding and make optimal use of the circulation of these different types of data, information, knowledge and intelligence requires sharing, dialogue and cooperation across the armed forces. This warrants further exploration of the grassroots knowledge production practices and content. The next sections describe the practice and the role of organisational aspects in these practices in more detail.

The practice

CREATING A PRIVATE COMMAND POST

When asked about their motivation behind knowledge production initiatives, the majority of respondents expressed a combination of strong personal interest in Russian military operations and a perceived operational knowledge gap within the wider defence organisation. This interest did not develop the moment Russia invaded Ukraine, but was developed during their previous military career – sometimes stretching back into the Cold War in the 1980s – or more as a personal ‘hobby’ over the years. Skills and expertise were at least partly developed in their private free time, at home or in their barracks housing,²⁹ on their personal devices. One respondent had learned online investigation techniques by participating in non-Defence related projects, being part of an informal international network of experts that included people formerly prominently involved with Bellingcat.³⁰

Respondents differed in how much of their free time and effort was invested, and varied in the location and setting in which they conducted their activities. Some did this more casually in between other activities, while others structurally spent between 1 and 2 hours every day ‘scrolling the internet’, amounting to at least ‘an extra working day per week’ and continuing activities during the holidays.³¹ A respondent also described how the regular habit of searching the web and doing online investigations blurred his professional interest and knowledge with his private life: “On a typical evening, I enjoy a glass of wine on the couch with my wife, as she watches TV and I browse on my laptop.”³² Others stated how some have set up several computers and screens in a dedicated space, which they vividly labelled as a ‘private command post’.³³ One respondent indicated he maintained a strict separation between work-related internet research conducted via Defence IT systems, and his private online investigations at home on non-Defence related topics. Regardless of how much time and effort was invested, for all respondents gaining knowledge on Russian Military Operations seemed to be a particular ‘way of life’.

The respondents gathered their information through publicly available online sources, for example by buying Russian handbooks to translate,³⁴ scrolling through specific Russian military operation blogs³⁵ or exploring social media platforms, like the Russian V-kontakte.³⁶ In the process, several respondents have developed an informal (international) personal network, which they actively use to gather information collectively.³⁷

During these conversations, several respondents acknowledged being aware of the associated risks of conducting open source research on their private laptops and mobile phones, for example in terms of privacy and cyber security.³⁸

WHATSAPP AS COMMS

A recurring practice was the use of easily accessible messaging services for communication, such as WhatsApp, to share information with other ‘hobbyists’, informal contacts and close colleagues.³⁹ Again, demonstrating cyber security awareness, some respondents noted how Signal should be preferred over WhatsApp as it provided better data protection.⁴⁰ In part this practice, including the collection and analysis of open source on private devices, emerged because with Defence IT there are practical limitations to access the internet and restrictions on the use of social media. Mostly because informal knowledge production often takes place outside working hours, it simply makes private phones and laptops more readily available. WhatsApp groups were used to quickly disseminate current developments and insights. One respondent explained that especially in the case of current events, WhatsApp is used to share initial insights and main takeaways.⁴¹ This informal

communication channel is occasionally also used by military commanders reaching out to their staff officers on the weekend.⁴²

COFFEE MACHINE NETWORK

The different knowledge production initiatives reflected a fragmented and informal network. Respondents know each other by name, but there is not necessarily wide and frequent communication or coordination. Many recognised that knowledge sharing between production initiatives and with DISS analysts was mainly a “coffee machine affair”. Or as one respondent expressively characterised it: ‘professional idiot meets professional idiot at the coffee machine at work’.⁴³ Experts found each other through an informal network at the workplace to share and discuss insights.⁴⁴ The value of this informal network is emphasised, as circulating operational knowledge of Russian Doctrine had even helped DISS officers to reevaluate their strategic assessment on a specific military topic.⁴⁵ Another example shows how a respondent’s international training activities helped him to gain relevant information from an international military contact, which was shared – by coincidentally coming up over coffee – with a knowledge centre, only then to be eventually shared with DISS via informal contacts.⁴⁶

Out of this informal network, a grassroots initiative – the Think Tank Russian Federation (DTRF) – emerged. Organised four times a year, the platform brings together experts on Russian Military operations and functions as a bridge between strategic, operational and tactical insights. The idea for this platform was initiated by Army officers and facilitated by the G2 level⁴⁷ illustrating the positive effects of when informal networks start to organise for sensemaking practices.

EXPERTISE

For the majority of the respondents, both within and outside DISS, having the right expertise was essential. Besides producing and monitoring information, this also entailed a felt responsibility to debunk claims in products and presentations by others. Yet, ideas on what constitutes ‘adequate’ or ‘the right’ type of expertise differ. As outlined above, the respondents’ interest and expertise in the Russian military accumulated throughout the years and (partly) in private. For some respondents, professional experience during the Cold War context triggered their interest and a willingness to learn more.⁴⁸ Others just developed a personal interest in Soviet Doctrine, resulting in reading topic-specific books, monitoring blogs and exploring social media platforms.

For intelligence analysts within DISS, years of professional experience and access to classified sources shaped their expertise. They felt the legitimacy of their

expertise was enhanced by working for the service, as DISS is officially considered the knowledge authority on Russian military operations.⁴⁹ The analysts argued that although knowledge centres outside DISS have enough capacity to fill information gaps, they do not always have enough expertise to assess the broader relevance of information and often lack the access to those pieces of information required to come to a fully informed assessment.⁵⁰ One analyst mentioned that they made use of the translated Russian handbooks, indicating how grassroots initiatives did provide a useful translation capacity.⁵¹

In order to fuse private knowledge production initiatives into the workplace, it is essential that the respondent's expertise is recognised among colleagues.⁵² Different factors contribute to such recognition, including the 'approval' of high ranking generals, the respondents' reputation as experts among peers and a need among intelligence professionals to fill in a certain information gap. A grassroots assessment on a specific Russian military operation was applauded among peers, but because of other priorities and limited capacity it took some time before DISS analysts became aware of the assessment and its valuable contribution at the strategic level. This changed after analysts had more time and recognised its value. Eventually, even the DISS director expressed his appreciation of the product.⁵³ This 'approval' of the head of DISS contributed to the visibility of the product and wider recognition of the underlying expertise, resulting in that the producers are now frequently invited to present their findings to high level military commanders.

Another example concerns the foundation of the Expertise Cell Russian Military Operations. One of its members had retired from military service, when a former colleague, supported by the unit's commander, asked him to join a new project on Russia. His authoritative reputation as a connoisseur of Russian Military Doctrine had been shaped by his professional Cold War experience and ongoing private efforts to keep track of current developments.⁵⁴

Differently, the Military Engineering Knowledge Centre already existed as an organisational unit within the Dutch defence organisation. However, the recent war in Ukraine made clear how specific operational knowledge on military engineering was underdeveloped. During a discussion following an exercise intelligence briefing, a committed intelligence analyst acknowledged the expertise of a colleague, asking him to write down the knowledge he gathered on his own initiative to fill the existing gap.⁵⁵

FORMAL OUTPUT AND ORGANISATIONAL IMPACT

The somewhat hidden character of local ingenuity and expertise created personal ways of dealing with knowledge production norms and rules. As became clear, respondents navigated between being aware of the security risks of informal

practices and the need to conduct their work in a viable manner. With regards to the dissemination of products one respondent explained that, based on previous experiences of losing access to online sources, he now publishes his knowledge products deliberately without sources of reference, yet also to avoid 'unnecessary and unhelpful discussions' within the Defence organisation.⁵⁶ Another respondent did include references to sources, but similarly kept feedback rounds limited to avoid creating too much discussion.⁵⁷ Although the need for this felt obvious to both respondents, others note that this complicates the bestowing of expertise and credibility on producers and products. As one senior intelligence professional explained:

I refuse to formally publish products sent to me via informal channels, that are based on open source information, as I cannot assess and vouch for its quality in my professional capacity.⁵⁸

This respondent's approach reflects that besides security risks, the informal practice of grassroots knowledge production initiatives poses a potential risk to the product's adoption within the wider Defence organisation. Despite this risk, the respondents thought working in an informal manner was favourable and beneficial to their output. It illustrates how informal practices can conflict with formal organisational structures, potentially resulting in a loss of relevant information.

Generally, as grassroots knowledge production initiatives result in more and more formal output at different organisational levels, concerns among intelligence professionals increase about the informal ways products are created.⁵⁹ Discussion about the labelling of products and practices as 'intelligence' also reflects this. Initially the Expertise Cell was named 'Project Combat Intelligence', and its first publications titled 'intelligence bulletin', as the people involved considered themselves to be an 'intelligence expert' and 'part of the intelligence domain'.⁶⁰ The title of publications was later changed to 'bulletin' and 'information bulletin', while still maintaining a form of classification ('NATO Restricted' or 'For Official Use Only').

According to its producers, recent handbooks developed by the Military Engineering Knowledge Centre and Expertise Cell Russian Military Operation should be viewed as basic information.⁶¹ Alongside basic information, the handbooks included assessments, also incorporating feedback from peers, thereby transforming data and information into knowledge and showing some resemblance with the evaluative process of intelligence production. In any case the handbooks have shaped understanding of the Russian military and the war in Ukraine, and they are used for training purposes and scenario planning. According to the respondents, both handbooks gained international recognition.⁶² While not formally considered intelligence, publications are authorised as official Defence products. For the

Expertise Cell, this authority comes from the commander of the Joint Intelligence, Surveillance, Target Acquisition, and Reconnaissance Command (JISTARC), also commander of the Army Intelligence and Security Corps. It illustrates how, in practice, bureaucratic and academic distinctions between information, knowledge and intelligence can become blurry and lead to misunderstandings about the value of content.

Other examples of formal output or organisational impact include events and symposia, and the further institutional establishment of knowledge centres, as formal entities. In 2025 the Expertise Cell will likely become an organisational unit, after several years of having an ambiguous organisational status. This will also provide the opportunity to hire more personnel. Also that year, the knowledge development task of the Military Engineering Knowledge Centre will be performed by a full time employee, meaning the job does not have to be performed in free time and on own devices. Furthermore, in the plans for a future joint operational headquarters, a 24/7 'fusion cell' is foreseen, to function as a platform for knowledge gathering from different organisational units and increase the collection of publicly available information, to maintain a current intelligence picture. Currently, the J2 branch of the Directorate of Operations already performs such a task. Yet the fusion cell is intended to substitute work now done by J2 staff officers during the weekend, also at home.⁶³ Telling is how the *fusion* cell is intentionally not referred to as an 'intelligence analysis' cell, as this is reserved for the DISS.⁶⁴

As outlined above, the DTRF emerged as a grassroots initiative and developed into a platform that is facilitated by the organisation. The G2 Army Intelligence branch office coordinates and shares the agenda among interested participants, a meeting location is provided at a Defence facility, and the event is hosted during working hours. Another example of a grassroots initiative that got institutional support was a Russian military operations symposium, held for a large and diverse audience of armed forces personnel. Inspired by the ongoing informal exchange of information, an intelligence analyst had pitched the idea for this to his senior leadership, who were willing to facilitate it and made him responsible for the project. The organisation of such an event, where DISS and armed forces personnel could present and discuss their views in a highly classified and secure environment was unprecedented.

The need for working with higher classifications and safeguarding quality of formal products was stressed by respondents working within DISS. Apart from doubts about the ambiguity of informal knowledge production processes, they expressed concerns that wide dissemination makes it more difficult to restore any mistakes.⁶⁵ Since handbooks on Russian military operations are approached as basic information, the classification level is low ('restricted', 'for official use only', or even 'unclassified') enabling them to be spread at a fast pace to a wide audience.

As one senior intelligence officer explains: “Due to accessibility, colleagues will use this kind of information quicker than waiting for products produced within the boundaries of DISS’s black box.”⁶⁶

Yet, while intelligence analysts wish to have the capacity to provide feedback on the formal products resulting from informal knowledge production initiatives, the necessary time and manpower are simply lacking. Moreover, DISS intelligence analysts do not structurally receive all knowledge products via formal channels. One intelligence respondent was not even aware of the existence of DTRF (or specific handbooks). Generally, the fragmentation of the information landscape was noticed by all respondents, and tied to a wider concern about the lack of a common operational picture within the Dutch defence organisation. The next section further discusses the role of the organisation in facilitating knowledge production initiatives.

The organisation

During the interviews the role of the organisation was frequently addressed. Almost all of the respondents, including several intelligence analysts, shared a positive stance towards informal knowledge production initiatives within the Dutch defence organisation. Yet what is frequently highlighted at the same time, is also the need for the organisation to adopt a more facilitating role.

LEGAL AND ORGANISATIONAL FRAMEWORK

In the previous section it became clear that the somewhat hidden character of local ingenuity and expertise resulted in informal and personal decisions on how to produce products, at times also with a preference to avoid unnecessary discussion on content and method. A similar tendency could be examined in discussions about how respondents navigated between the required conditions to do their work and existing legal and organisational frameworks. Since all respondents are bound by the General Data Protection Regulation (GDPR), they are legally permitted only to conduct professional online activities domestically upon a formal request. Respondents argued that the LIMC legacy increased awareness of how their activities may be received by others. Respondents emphasised the importance of adhering to the legal framework, but also stressed that ‘stretching’ the limits of this framework was sometimes necessary to ‘do their work properly’. One respondent remarked that some part of his workflow could be viewed as ‘perhaps not completely GDPR compliant’.⁶⁷ The respondent argued that because of work demands, you sometimes are confronted with ‘bureaucratic hurdles’. The best way is to sometimes circumvent these hurdles, hoping nobody starts complaining.⁶⁸ For example,

when collecting data and information via social media, this can involve personal data. Yet through processing and analysis, the conclusions that are drawn based on such data are usable in a more abstract way. This logic seemingly mirrors other research in which the local ingenuity to creatively navigate formal procedures and regulation to practically and safely meet daily work demands, is even identified as a key factor for operational effectiveness and success.⁶⁹

Lower level commanders, who acknowledged the expertise of the respondents, also navigated between a willingness to support and facilitate grassroots knowledge production initiatives and existing organisational possibilities and limitations. Some allowed time during working hours to work on such projects.⁷⁰ Although, a respondent argued, this was in practice still little time, it showed recognition and appreciation of the respondent's work.⁷¹ In another case, the unit commander explored and used different personnel constructions to formally hire an expert as project leader, enabling the continuation of the respondent's valuable work. This meant that, in between formal contracts, the respondent had to continue working for free, and had to register as a self-employed expert.⁷²

CONSTRUCTION DRAWING

Alongside the difficulty of navigating between required conditions and existing legal and organisational frameworks, a frequently expressed obstacle for knowledge production initiatives was the absence of a centralised information management system.⁷³ One respondent argued that in order to improve this, the first step is to create a 'construction drawing' (information architecture) for information management.⁷⁴ Without such a construction drawing, available information is fragmented throughout the entire system. In the current fragmented information landscape, it is unclear what is produced and by whom. Although several digital sharepoints are created, accessible for everyone throughout the Defence organisation, it proves difficult to reach audiences beyond internal units.⁷⁵ An additional challenge for proper information management is the quickly rotating military personnel, who take knowledge with them without sharing and transferring it into collective databases.⁷⁶ One respondent argued that in order to gain a better overview of what is known, it is crucial that knowledge is transferred from individuals into the system.⁷⁷

The absence of a central information management system stressed the importance of informal connections between colleagues. The speed of this workflow, according to one respondent, had its benefits. His main concern with creating a top-down and centralised information management system was that it could create extra administrative hurdles which would hamper the speed of the existing informal process.⁷⁸

SHARED UNDERSTANDING

Despite some respondents' concerns that a centralised data and information management system would create additional administrative barriers, respondents agreed that having an overview of what is produced, where and by whom is necessary to generate a shared understanding. It would improve the way intelligence analysts fulfil their daytime job of briefing commanders, on strategic and operational intelligence developments.⁷⁹ A central overview is important for quick dissemination of assessments to the political or military leadership. Currently, with the absence of this overview, intelligence analysts are sometimes forced to make up their own assessments without, or only partly, consulting experts of other Defence organisations. In practice this has led to friction with those who felt left out of the process.⁸⁰

From an intelligence perspective, a central information management system is deemed important for a comprehensive shared, organisation-wide understanding of strategic, operational and tactical issues. According to intelligence analysts, this would enable knowledge production initiatives outside DISS to correspond to views within DISS, helping to address any errors. A respondent argued that although DISS is considered to be a knowledge authority, it cannot determine what is right or wrong on all topics.⁸¹ As such, experts outside DISS are sometimes invited to synchronise views.⁸² This is however not done on a structural basis, but ad hoc and initiated from within the informal network outlined above.

Discussion on both the need for a shared understanding also led to the question of who (should) be in charge of this. Intelligence analysts argued that this is something DISS should do, based on their 'authority'. They quickly added, however, that currently DISS does not have the capacity to fulfil such a role.⁸³ Others, within the Army, argued that, in theory, this should be done by the G2 Army Intelligence branch office. Similar to DISS, they had little capacity to do this. The capacity-problem was a recurring topic in discussions about how to improve the production of knowledge initiatives within the organisation. In the following part, the role of leaders and mindset in this discussion is addressed.

LEADERSHIP AND MINDSET

As became clear in the previous part, the respondents acknowledged the positive effect of leadership recognition and appreciation of their work. Despite these positive and promising examples, respondents stressed that an increased sense of urgency is needed to further facilitate and support knowledge production initiatives within the organisation.⁸⁴ Regarding IT infrastructure, one respondent remarked that this sense of urgency is missing at the leadership level. This is reflected by a

preference to work in old-fashioned ways, for example to work on paper instead of digital devices.⁸⁵ If high level commanders have little knowledge of information management and a strong preference of working on their own personal ipads, this could be counterproductive for the feasibility of required change.⁸⁶ Similar to the importance of recognising expertise by commanders, respondents argued that their involvement in supporting information management is just as crucial.⁸⁷

Moreover, military officers working at Army intelligence positions are mainly trained as basic intelligence officers, without a specific subject matter expertise in the domain they are working in. This means that the sensemaking task within military units is sometimes undervalued, creating information gaps that need to be filled.⁸⁸ More specialised training could help intelligence officers to perform and guide the process in more efficient ways. All in all, in the interviews it became clear that improvement is not only about finding IT-enabled solutions, or reshaping the legal and organisational framework, but also requires a mindset change among employees at all levels.

Conclusion

This chapter explored the practice and organisation of grassroots knowledge production initiatives within the Dutch defence organisation. The aim was to gain a better understanding of how such knowledge production initiatives can provide useful information for military intelligence and support the scaling of practices, for example through internal crowdsourcing. The study showed how a combination of strong personal interest in Russian military operations and workplace objectives drove respondents to (privately) collect and share their knowledge. Respondents dedicated private time and IT resources extensively, maintaining contact with others via informal online channels or physical networking spaces. While these practices creatively dealt with hierarchical organisational and legal frameworks, it also reflects a form of loyalty and dedication to the military. Working on these initiatives brought the respondents joy and recognition among peers and commanders. Occasionally, this recognition resulted in the institutionalisation of initiatives into a regular ‘think tank’ conference, or formal products used for training and scenario planning. The informal initiatives reflect a fertile ground for further exploration. It is important to understand how grassroots activities, and their potential for fostering mutual understanding and unity of effort, offer the opportunity to raise the level of expertise within the Dutch defence organisation. An important aspect of fostering this is to also challenge each other’s claims in products and presentations. Cultivating these practices requires strong organisational and leadership support, for example also improving the central information management system within

the Defence organisation. Literature on crowdsourcing also defines IT infrastructure as a key element.

In discussions on how these informal knowledge production initiatives could support the scaling of military intelligence practices, a recurring topic was finding a balance between the benefits of the hidden character of local ingenuity and the need for a more structured approach. Although the hidden character of (private) data and information collection granted the respondents a somewhat uncontrolled space for exploration and creativity, a more structured approach could help to mitigate some of the associated functional and organisational risks; for example, fragmentation of the strategic and operational picture, or legal and security risks associated with collecting and analysing specific information on private devices. Not sufficiently addressing these challenges and risks fosters reluctance to use grassroots generated products within the broader organisations.

This chapter does not provide answers to important questions regarding the legal mandate or the technological specifics of internal crowdsourcing, yet it does shed light on some of the basic conditions for facilitating such initiatives within the Dutch defence organisation. Firstly, improving quality control and coordination on what information is produced, where and by whom, would better allow for realising top-down internal crowdsourcing as an effort to scale military intelligence capabilities. This can be done through facilitating events, symposia or workplace settings at which experts can meet each other, like the example of DTRE. Directing, coordinating and facilitating grassroots initiatives and engaging with internal crowdsourcing, as a form of scaling military intelligence practices, also creates a more comprehensive understanding among employees across the defence organisation.

A condition that will remain is the bureaucratic distinction between information, knowledge and intelligence, if only due to the current legislation. Although this will likely continue to cause organisational tension between products produced by DISS and other military units, stronger connections between grassroots initiatives and intelligence organisations could have a positive effect in both directions. The current proposal for a new Armed Forces Act could consider more fully acknowledging and facilitating the existing grassroots knowledge production initiatives described in this chapter. Better integrating grassroots initiatives into the broader framework of military intelligence practices could, parallel to the practice of sourcing external knowledge and information, enhance scalability and innovation.

Notes

- ¹ Coviello et al., “Organizational scaling”, 2–21.
- ² Emma van der Meulen, *Madness/Wisdom of crowds*.
- ³ Geiger, “Personalized task recommendation”, 19.
- ⁴ Davies, “The problem of defence intelligence”, 797–809.
- ⁵ Lowenthal, *Intelligence: From secrets to policy*, 57–70.
- ⁶ Brabham, “Crowdsourcing as a model for problem solving”, 75.
- ⁷ Ulbrich et al., “Internal crowdsourcing in companies”, 166–184.
- ⁸ Byrén, “Internal crowdsourcing for innovation development”, 2.
- ⁹ Zuchowski, “Internal crowdsourcing”, 161–175.
- ¹⁰ Estellés-Arolas and González L. Guevara, “Integrated crowdsourcing definition”, 19.
- ¹¹ Ulbirsch et al., “Internal crowdsourcing in companies”, 3.
- ¹² Pothoven et al., “Producer-client paradigms”, 68–85.
- ¹³ Pothoven et al., “Producer-client paradigms”, 73.
- ¹⁴ Lowenthal, *Intelligence: From secrets to policy*, 57–70.
- ¹⁵ Hulnick, “What’s wrong with the intelligence cycle”, 959–979.
- ¹⁶ Saskia Pothoven et al., “Producer-client paradigms”, 68–85.
- ¹⁷ Leonie Boskeljon-Horst, “The bogeyman unveiled”.
- ¹⁸ Leonie Boskeljon-Horst, “The bogeyman unveiled”.
- ¹⁹ Leonie Boskeljon-Horst, “The bogeyman unveiled”.
- ²⁰ For example, Vrist Rønn and Høffding, “The epistemic status of intelligence”, 694–716.
- ²¹ Räsänen and Nyce, “The raw is cooked: Data in intelligence practice”, 655–677.
- ²² de Werd, “Reflexive intelligence”, 512–526.
- ²³ Wei Choo, “The knowing organisation”, 329–340.
- ²⁴ Lowenthal, *Intelligence: From secrets to policy*, 57–70.
- ²⁵ Zocholl et al., “Towards a NATO lessons learned ontology”, 1–8.
- ²⁶ NRC, “Landmacht Verzamelde Tijdens Coronacrisis”.
- ²⁷ Rijksoverheid, “Onderzoekscommissie Land Information Manoeuvre Centre”.
- ²⁸ Eerste Kamer der Staten-Generaal, *Jaarbericht Toezichhouders Defensie 2023*.
- ²⁹ R2, R3, R5, R6, interview.
- ³⁰ R5, interview.
- ³¹ R2, interview.
- ³² R6, interview.
- ³³ R2, R4, R6, interviews.
- ³⁴ R2, interview.
- ³⁵ R3, interview.
- ³⁶ R6, interview.
- ³⁷ R2, R6, interviews.
- ³⁸ R2, R3, R4, R5, R6, interviews.
- ³⁹ R4, R6, interviews.
- ⁴⁰ R2, interview.
- ⁴¹ R4, interview.
- ⁴² R4, interview.
- ⁴³ R2, interview.
- ⁴⁴ R3, interview.

- ⁴⁵ R2, interview.
⁴⁶ R2, interview.
⁴⁷ R3, interview.
⁴⁸ R3, R6, interviews.
⁴⁹ R7, R8, interviews.
⁵⁰ R7, R8, interviews.
⁵¹ R8, interview.
⁵² R2,R3, R4, R5, interviews.
⁵³ R5, R6, interviews.
⁵⁴ R3, interview.
⁵⁵ R2, interview.
⁵⁶ R3, interview.
⁵⁷ R2, interview.
⁵⁸ R4, interview.
⁵⁹ R4, R7, R8, interviews.
⁶⁰ R3, interviews.
⁶¹ R3, interview.
⁶² R2, R3, interviews.
⁶³ R4, interview.
⁶⁴ R4, interview.
⁶⁵ R7, R8, interviews.
⁶⁶ R7, interview.
⁶⁷ R2, interview.
⁶⁸ R2, interview.
⁶⁹ Leonie Boskeljon-Horst, "The bogeyman unveiled".
⁷⁰ R2, interview.
⁷¹ R2, interview.
⁷² R3, interview.
⁷³ R1, R4, R7, R8, interviews.
⁷⁴ R1, interview.
⁷⁵ R1, interview.
⁷⁶ R1, interview.
⁷⁷ R1, interview.
⁷⁸ R8, interview.
⁷⁹ R4, interview.
⁸⁰ R4, interview.
⁸¹ R8, interview.
⁸² R7, R8, interviews.
⁸³ R7, R8, interviews.
⁸⁴ R1, R8, interviews.
⁸⁵ R1, interview.
⁸⁶ R1, interview.
⁸⁷ R2, R8, interviews.
⁸⁸ R2, interview.

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Wisdom of crowds: An exploratory case-study on crowdsourcing as a method for intelligence gathering within the Dutch Defence Intelligence and Security Service

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Abstract

A recent example of how intelligence organisations aim to strengthen the scalability of expertise, is the exploration of crowdsourcing methods. Rather than relying solely on internal professionals, they engage civil actors in national security matters. This study examines challenges in adopting crowdsourcing within military intelligence, focusing on the Dutch Defence Intelligence and Security Service (DISS). By analysing technological frames – how stakeholders interpret and assess technologies – 12 semi-structured interviews show that the stakeholders' shared positive view may support initial adoption. However, conflicting perspectives on the purpose and implementation of crowdsourcing could hinder its practical, day-to-day use. This study provides theoretical and practical insights for understanding and improving crowdsourcing in military intelligence, highlighting both opportunities and potential obstacles in this context.

Keywords: Crowdsourcing; Military intelligence; Technological frames

Introduction

A growing body of research in intelligence studies reflects on the adoption of crowdsourcing methods by intelligence organisations.¹ In general, crowdsourcing refers to “a problem solving and knowledge production model that leverages the collective intelligence of online communities for specific purposes set forth by a crowdsourcing organization.”² In intelligence studies, a key debate revolves around the extent to which crowdsourcing can assist intelligence organisations in addressing both traditional and modern challenges, such as groupthink, data collection, and innovation. While some authors contend that crowdsourcing should become a new intelligence discipline,³ others argue that it will not be useful in the long term, as it fails to generate expertise and knowledge demanded by policymakers.⁴ Despite growing interest, the academic discussion on intelligence studies remains

in its early, exploratory stages. The debate is largely conceptual, with limited empirical evidence to support its claims. This raises questions about its practical value, long-term sustainability and capacity to address the complex demands of modern-day intelligence organisations. The aim of this chapter is to provide a deeper understanding of the advantages and challenges associated with adopting crowdsourcing within intelligence organisations.⁵ This is done by exploring the *technological frames* of internal stakeholders within the Dutch Military Intelligence and Security Service (DISS). According to Orlikowski and Gash (1994), technological frames provide a means to analyse assumptions, expectations, and knowledge that individuals use to interpret a technology's application and consequences within a specific context.⁶ Understanding the technological frames of crowdsourcing among intelligence officials could contribute to a more nuanced academic debate on the advantages and challenges of this technology in the intelligence domain. Beyond its theoretical significance, this understanding also offers practical value by supporting practitioners concerned with enhancing the scalability of expertise within DISS and the broader intelligence community.

This chapter focuses primarily on *external* crowdsourcing, while the chapter by van der Meulen and de Werd (Chapter 13) examines how fostering *internal* crowdsourcing initiatives within the Dutch Defence organisation could enhance the scalability of military intelligence. In contrast to internal initiatives, external crowdsourcing involves efforts by organisations to engage individuals or groups outside their internal structure to contribute ideas, expertise, or labour towards achieving specific goals or solving problems. Internal crowdsourcing, on the other hand, extends problem-solving to a large and diverse group of self-selected contributors across an organisation's boundaries, bridging business divisions, geographic locations, and hierarchical levels.⁷

Both studies view crowdsourcing as a method to improve the scalability of knowledge within intelligence organisations. Scalability, in this context, is treated as an organisational capability that could support the broader scaling process. Crowdsourcing has the potential to expand an organisation's capacity to gather, process and utilise knowledge or resources without proportionally increasing its internal cost or infrastructure. Therefore, scalability is understood as not simply about growth (e.g., increasing staff or hardware) but also about achieving coherence among technological infrastructure, organisational structures, and strategic outlook.⁸

Theoretical framework

In the most comprehensive academic work on the concept of crowdsourcing to date, *Crowdsourcing as a Model for Problem Solving*, Daren Brabham (2008) defines crowdsourcing as “an online, distributed problem-solving and knowledge production model that leverages the collective intelligence of online communities to serve specific organisational goals.”⁹ A literature review by Enrique Estellés-Arolas and Fernando González Ladrón de Guevara reveals that by 2012, forty different interpretations of crowdsourcing had emerged.¹⁰ To address the lack of conceptual clarity, Brabham (2013) refined his definition, outlining four general conditions of crowdsourcing:¹¹

1. An organisation has a task it needs performed;
2. A community (crowd) that is willing to perform the task voluntarily;
3. An online environment that allows the work to take place and the community to interact with the organisation, and;
4. Mutual benefit for the organisation and the community.

It is the fourth factor – mutual benefit – that distinguishes crowdsourcing from other online participatory initiatives. In crowdsourcing efforts “the locus of control must reside between the organisation and the online community rather than primarily in one or the other.”¹² The mutual benefit element is crucial because it ensures a collaborative, co-creative outcome that could not have been achieved without the contributions and efforts of both parties. Tangible or intangible benefits, such as monetary rewards, recognition, community status or a sense of purpose and/or alignment with a specific cause ensures that participants feel valued and rewarded for their contributions. Without mutual benefit, according Brabham, crowdsourcing risks becoming exploitative and unsustainable.

In order to gain a deeper understanding about how crowdsourcing is perceived and understood among intelligence practitioners, it is examined through the concept of *technological frames*.¹³ According Orlikowski and Gash (1994), technological frame consists of three domains: *nature of technology*, which refers to people’s images of the technology and their understanding of its capabilities and functionalities; *technology strategy*, which refers to people’s views of why their organisation acquired and implemented the technology, and *technology-in-use*, which refers to people’s understanding of how the technology will be used on a day-to-day basis, and the likely or actual conditions and consequences associated with such use.

Interpretations of technology are influenced by the various individual and group’s purpose, context, power and knowledge base. Due to these differences, technological frames are unlikely to be shared across different stakeholders. When the technological frames of internal stakeholders within organisations are

significantly different it can lead to difficulties and conflict around the development, use, and change of technology.¹⁴ These differences can create challenges in achieving a shared understanding or consensus on how to effectively implement or adapt technology, potentially hindering progress and cooperation within the organisation.

To examine the stakeholders' technological frames, a conceptual framework was constructed (see Table 14.1 below). This was done by conducting a literature review to explore how crowdsourcing is discussed within organisational studies and how these insights can be translated to intelligence studies. This review helped to identify key concepts, challenges, and opportunities related to the adoption of crowdsourcing. By analysing these insights, the framework provided a broader analytical lens through which empirical data on crowdsourcing in intelligence could be examined.

Literature reviews and most frequently cited works on crowdsourcing within organisation studies were compared with studies on crowdsourcing published in three mainstream intelligence studies journals: *The International Journal of Intelligence, Security, and Public Affairs*, *Intelligence and National Security*, and *International Journal of Intelligence and Counterintelligence*.¹⁵ The findings from the literature review were structured along the three technological frame domains. It became evident that academic insights on crowdsourcing within organisation and intelligence studies largely overlapped. However, five themes within organisational studies were not addressed within intelligence studies: the importance of mutual benefit, the challenge of crowd motivation, ethical issues, the influence of policy cycles, and the precondition of sufficient human and technological capacity (marked cursive).

Table 14.1 Conceptual framework

Technological Frame Domain	Indicators
Nature of technology	Crowdsourcing is a method for knowledge development
	Crowdsourcing could help with problem-solving
	Crowdsourcing is an open request
	Crowdsourcing requires <i>mutual benefit</i>
Technology strategy	Crowdsourcing is accessible technology
	Crowdsourcing is cost-efficient
	Crowdsourcing stimulates competitive advantage
	Crowdsourcing provides access to alternative skills and knowledge
	Crowdsourcing could support forecasting
	Crowdsourcing could help to bridge gap between organisation and public
Technology-in-use	Crowdsourcing raises <i>ethical issues</i>
	Crowdsourcing could support analysis
	Crowdsourcing raises secrecy issues
	Crowdsourcing raises legal issues
	Crowdsourcing could enable more <i>human and technological capacity</i>
	Crowdsourcing adaptation is hampered by slow <i>policy cycles</i>
	Crowdsourcing requires paying attention to <i>crowd-motivation</i>

Method

The study followed an exploratory qualitative case-study research design and was organised around one main case, the Dutch Military Intelligence and Security Service (DISS). Data was collected from multiple sources of evidence: internal stakeholders, primary and secondary source documents. Between May and August 2022, 12 semi-structured interviews with respondents were conducted. Respondents were part of three internal stakeholder groups within DISS: line managers, users (all-source analysts) and employees in the legal department. Due to privacy considerations, age, sex and professional background of the respondents are not included.

Access to different stakeholders was facilitated by the researcher's own professional network within the organisation, which offers both advantages and challenges. On the one hand, pre-existing relationships and the researcher's familiarity with the organisational context facilitated trust, which made participants more comfortable sharing insights and experiences. On the other hand, being familiar with the organisations creates assumptions about topics like technology adoption, potentially leading to biased questioning and overlooking critical questions or insights. To mitigate these challenges as much as possible, findings were discussed with independent professionals.

After conducting the interviews, data was categorised by stakeholder group, technological frame domain and interview questions. Data was coded by using the indicators identified in the conceptual framework outlined above. In order to identify general themes and patterns within each stakeholder group, the reoccurrence of indicators was counted and outlined in a code-overview. After the data of each stakeholder group was examined, coded and counted, the main themes were outlined in a general overview. This overview enabled cross-group analysis, focused on identifying common themes, outliers or patterns across stakeholder groups. The main aim of this cross-group analysis was to outline the stakeholders' technological frames and examine whether the technological frames reflected overall congruence or incongruence.

Main findings

Based on the interviews with internal stakeholders, three technological frames could be constructed. The technological frames of the users, managers and legal stakeholder groups are summarised in Table 14.2. For analytical purposes, only insights shared among the majority of the respondents within each stakeholder group are included. Issues of incongruence are marked in bold and outliers are marked cursively. The findings are discussed in more detail in section 6.

Table 14.2 Stakeholders' technological frames

Domain	User	Manager	Legal
Nature of Technology	<ul style="list-style-type: none"> - Knowledge production - Open request 	<ul style="list-style-type: none"> - Knowledge production - Open request - Problem-solving 	<ul style="list-style-type: none"> - Knowledge production - Open request
Technology Strategy	<ul style="list-style-type: none"> - Qualitative improvement of the intelligence product 	<ul style="list-style-type: none"> - Improvement of cognitive diversity 	<ul style="list-style-type: none"> - Technological innovation
Technology-in-use	<ul style="list-style-type: none"> - Analysis - Lack of secrecy - Crowd motivation - Policy-cycle - Organisational Culture 	<ul style="list-style-type: none"> - Analysis - Lack of secrecy - Organisational Culture 	<ul style="list-style-type: none"> - Analysis - Lack of secrecy - Legal

Nature-of-technology

Most respondents expressed little foreknowledge on crowdsourcing. One respondent within the user stakeholder group was a member of an online crowdsourcing platform for data scientists. Two respondents within the manager stakeholder group gained some crowdsourcing experience in previous jobs outside DISS. Respondents within the legal stakeholder group did not have any prior experience with crowdsourcing. During the interviews, respondents used mainstream crowdsourcing examples as a frame of reference, for example, open-source collective Bellingcat and Dutch television program 'Opsporing Verzocht'.

All stakeholders approached crowdsourcing as an open request and knowledge production tool. Contrary to users and employees in the legal department, managers also approached crowdsourcing as a specific problem-solving tool. One manager argued:

I think of crowdsourcing as the wisdom of many to solve a specific complex problem, or which you can use to get more knowledge about a specific problem. You use the knowledge of many different people, instead of using just one expert. (...) For example, I think crowdsourcing can be a solution to the problem of cognitive diversity within the organisation. Instead of consulting people with a background in international relations or history, you can consult many more different perspectives.

Technology strategy

The discussion on the nature of crowdsourcing was followed by a discussion on whether DISS should adopt crowdsourcing and why. Most respondents appeared to be in favour of the adoption of crowdsourcing by DISS, since it could provide access to relevant skills and knowledge. One respondent within the user stakeholder group and one respondent within the legal stakeholder group were more hesitant. The main reason against the adoption of crowdsourcing was the risk of giving away DISS's information position. The respondent within the user stakeholder group argued:

My feeling is that crowdsourcing is not something we should do. It just gives away your information position. Asking questions through crowdsourcing indicates that we do not have the information we need and need the help of citizens to gather it for us. As a citizen I would think: why do they ask this? I think it decreases the trust citizens have in us. Maybe citizens do not fully trust DISS, but I think they do trust our information position. We are a knowledge authority, somewhat like medical doctors. I would find it weird if doctors start to outsource the question: who knows what is going on with this patient? I think crowdsourcing will lower our reputation.

Although all three stakeholder groups argued that DISS should adopt crowdsourcing since it can provide access to relevant skills and knowledge, they differed in opinion about *why* it could be beneficial to DISS. Users, for example, argued that access to relevant skills and knowledge is beneficial to the qualitative improvement of intelligence products:

As an intelligence organisation we look globally and try to assess every aspect and incorporate this in our assessment, so-called PMESSI. If we are honest, with internal available capacity, we cover two aspects of this: politically and military. Factors like sociology or economics, these are topics we do not have enough specialists for. Yet, it is knowledge you do want to have, because our main product is an assessment of a situation or development. This product is as strong as the main components you can cover. If you can only cover two aspects, that's not good enough. With crowdsourcing you can expand the factors you can cover and eventually improve your analysis and assessment.

Managers argued that the access to relevant skills and knowledge could improve overall cognitive diversity within DISS:

I think it is a very useful recruitment pool. An econometrist working at ING is not going to work for the ministry of Defence, since we cannot pay him enough. With crowdsourcing

you can consult him for specific questions and incorporate his knowledge without hiring him full-time.

The employees in the legal department argued that access to skills and knowledge could improve DISS' technological knowledge.

Technology-in-use

In the third and final part of the interviews, more practical questions regarding the adoption of crowdsourcing within DISS were discussed. Respondents were asked about who or which unit should conduct crowdsourcing, the general consequences of crowdsourcing, and specific organisational barriers. Both within and across stakeholder groups there was no general agreement about who should conduct crowdsourcing within DISS. Some respondents referred to DISS's open-source intelligence unit (OSINT) as the most appropriate unit, due to its familiarity with online information environments. Others argued that crowdsourcing should be a new discipline, merged within existing team-structures, or outsourced to an external company. In these conversations, most respondents within all three stakeholder groups expressed concerns about the reliability of information received through crowdsourcing. According to most users, verifying crowdsourced information was challenging due to two factors. First, due to the possibility of receiving large amounts of data and second, due to the difficulty of estimating the level of expertise within the crowd. One user argued that due to the complexity of verifying crowdsourced data, it should be used as complementary to information that is easier to verify:

The reliability [of crowdsourced data] can be very low. You get a lot of information, but how do we verify this? You need to make some sort of verification list. If your data is crap, your analysis is crap as well, so I think you should combine crowdsource information with information which is easier to verify.

Like shared concerns about the reliability of information, most respondents shared a concern about the lack of secrecy. According to most respondents within the users and managers stakeholder groups, a lack of secrecy limits what kind of questions DISS could ask through crowdsourcing. Both managers and users argued that crowdsourcing was most useful for asking strategic, instead of more tactical questions. One manager argued:

I think you should be very careful about what kind of topics you are open about. With more general questions it is not a problem to be more transparent, but you need to make

a distinction. However, some information needs to get rid of their high classification and stimulate an open conversation.

The impact of DISS's specific organisational culture on the adoption of crowdsourcing was addressed by the majority of users and managers. This indicator was not outlined in the theoretical framework. Both users and managers emphasised the need to shift away from traditional perspectives on how intelligence is gathered within DISS. One manager argued:

Within DISS, we tend to look at intelligence questions from a somewhat traditional perspective. The assessment of the intelligence analyst, both military and politically, is superior. This has negative effects on alternative ways of intelligence gathering, like OSINT, but also on the feasibility of crowdsourcing projects, I think. I think it will be assessed as inferior knowledge. We need a change in mindset to incorporate and use external developments within existing organisational structures. But, this will lead to resistance, which can have a negative effect on the intelligence production process in general.

The ongoing discussion about the impact of organisational culture often revolved around a central theme: a mistrust of new technologies. One user argued:

It's all about cultural change. People will mistrust crowdsourcing from the start. For example, OSINT has proven its value in providing tactical information about the Ukraine war. Yet, people still need to get used to this. People are still nervous about technological innovations that are needed for doing proper OSINT research, imagine how this is going to be if we are about to communicate actively with the outside world.

Within the legal stakeholder group, both respondents argued that because of its innovative character, it is likely that crowdsourcing first needs to prove its value within DISS. However, the need for overall cultural change was not explicitly addressed.

When examining the areas of congruence and incongruence of the technological frameworks, it becomes clear they resolve around one central topic: scope. Whereas managers approached crowdsourcing as a multipurpose tool, suitable for a wide range of organisational challenges, users and legal respondents envisioned a more limited applicability of crowdsourcing within DISS. Differences in envisioned scope were mainly influenced by different cost-benefit evaluations of crowdsourcing as an intelligence gathering tool. For example, for employees in the legal department, the potential cost of losing DISS's information position weighed up against the potential benefit of having access to certain skills and knowledge. Managers and users shared this concern, but the potential benefit of having access to certain skills and knowledge motivated them to be less concerned about the potential costs.

To conclude, since only insights shared among the majority of the respondents within each stakeholder group were included in the overview, not all indicators of the integrated framework are represented in the technological frameworks. This means seven indicators were not or only sparsely addressed by the respondents: mutual benefit (3); accessibility (5); cost-efficiency (6); competitive advantage (7); forecasting (9); ethical (11); and capacity (17). This is discussed in more detail in section 6.

Conclusion

Orlikowski and Gash (1994) argue that when technological frames within an organisation differ significantly, it can lead to difficulties and conflicts during the adoption of new technologies. In this explorative study, the technological frames of three stakeholder groups showed both congruence and incongruence, which could have a dual impact on the adoption of crowdsourcing within DISS.

On the positive side, shared understanding and support for crowdsourcing among most stakeholders could facilitate the early stages of adoption, where employees familiarise themselves with the technology, its value, and its capabilities. This shared willingness to learn could provide a strong foundation for further exploration. On the other hand, differing views on the scope of crowdsourcing, concerns about operational security and organisational challenges, could hinder progress during later stages, such as decision-making on implementation and evaluation. For example, while managers saw crowdsourcing as a multipurpose tool for strategic questions, employees in the legal department view open communication with the crowd as a security risk. These conflicting perspectives could slow down the process or at the extreme end of the scale, result in the overall rejecting of crowdsourcing as a method for intelligence gathering.

Overall, this study suggests that while crowdsourcing holds promise to improve expertise scalability in military intelligence, successful implementation depends on understanding how diverse and situated perspectives and organisational culture impact the adoption process. In the following section, the main findings are discussed, along with the potential role of a boundary spanner in facilitating a future adoption process.

Discussion

Although mutual benefit is considered a core defining feature of crowdsourcing,¹⁶ this concept was not mentioned in the respondents' perspectives. Most viewed crowdsourcing as a process that should remain under DISS control. This stance

likely mirrors the traditional hierarchy between intelligence services and the public, rooted in the belief that intelligence experts are better equipped to act in the public interest. However, this perspective overlooks the more nuanced views of respondents, who were hesitant about closer interaction with the public but did not entirely reject or dismiss its potential value. Respondents appeared to balance between recognising the benefits of collaboration and questioning its risk. This aligns with a broader discussion in intelligence literature, where modern intelligence organisations are seen as navigating a tension between maintaining institutional authority and addressing emerging threats by closer cooperation with the external public, such as civil actors.¹⁷

Most respondents across stakeholder groups supported the adoption of crowdsourcing, citing its potential to provide access to relevant skills and knowledge. While this aligns with core arguments about the benefits of crowdsourcing in intelligence studies it represents only a fraction of its potential applications. As outlined in the theoretical framework, crowdsourcing can also be used for tasks like data processing and forecasting.¹⁸ This limited perspective likely stems from respondents' limited prior knowledge of crowdsourcing. Similar to the previous observation, this focus reflects a preference for a more passive information collection over active co-productions with the public. However, when analysing why access to relevant skills and knowledge was viewed as beneficial, it becomes evident that respondents shared a common ambition: to make better-informed decisions and predictions about the future, sometimes referred to as forecasting. Nonetheless, Philip Tetlock and Dan Gardner, in their book *Superforecasting: The Art and Science of Prediction*, emphasise that effective forecasting is not solely about gathering more information from diverse sources. It also requires collaborative teamwork, diverse perspectives, probabilistic thinking, and a willingness to admit mistakes and adapt when necessary.¹⁹

Several other key indicators from the framework – accessibility, cost-efficiency, and competitive advantage – were absent in the respondents' perspectives. This omission is surprising, given that these factors are commonly cited in organisational studies as primary motivations for adopting crowdsourcing. A closer look at why respondents valued access to relevant skills and knowledge suggests that their focus also lay on addressing the challenge of enough technological and human capabilities. Capacity issues are prominently highlighted in several official Ministry of Defence documents, such as Dutch Defence Vision 2023. To handle evolving threats, the organisation requires greater investment in information technologies and data management.²⁰ It appears that stakeholders within DISS address the value of new technology in terms of their ability to address most urgent challenges, thereby overlooking broader potential benefits.

During conversations on the challenges of crowdsourcing, the respondents rarely mentioned ethical issues. This omission aligns with findings in intelligence studies that suggest ethics are often underemphasised in the (study of) formal practices of intelligence organisations.^{21,22,23} While there is some focus on the moral virtues of individual intelligence practitioners, little attention is given to developing comprehensive ethical frameworks to guide organisational practices. However, Jaeger and Dunn Cavelti (2019) highlight the importance of addressing ethical concerns in crowdsourcing, as it shapes and governs relationships between the public and organisations. They argue that questions of proportionality, legitimacy, and accountability must be addressed by researchers, policymakers and practitioners.²⁴

Most respondents agreed that the main barrier to adopting crowdsourcing is DISS's organisation culture. According to the respondents, this culture appears to favour traditional intelligence methods over more innovative approaches. This finding is not unique to DISS: organisational culture is widely recognised in technology adoption literature as a key barrier to innovation and change.²⁵ However, by attributing responsibility to change to organisational culture, respondents effectively shift accountability to another person, group, or unit. This highlights an additional challenge for the future: ownership.

In conclusion, this explorative study finds that the influence of technological frames on the adoption of crowdsourcing could be dual – both positive and negative. However, as became clear, technological frames are not the sole-determinant. Factors such as organisational culture and national context also play a significant role. This underscores the complexity and context-dependent nature of crowdsourcing adoption, emphasising that future researchers and practitioners need to take into account the evolution of multiple interrelated factors.^{26,27,28}

Future research and policy recommendations

More research is needed to expand the academic debate on crowdsourcing in intelligence. Future studies could include stakeholder analysis to explore a wider range of actors involved in the technology adoption process. For example, including the perspective of data managers could provide interesting insights on how crowdsourcing methods lead to data storage challenges. Comparing intelligence organisations could shed a more nuanced light on the impact of organisational and national cultures. While this study predominantly focused on crowdsourcing as a knowledge production tool, further research could explore its potential for data processing and developing technological skills. Additionally, examining the technological frames of external stakeholders, such as policymakers and the crowd, could provide valuable insights.

For DISS, when adopting crowdsourcing, a follow-up study could track how initial technological frames evolve. Practically, project managers should focus on leveraging common ground between stakeholders, potentially by appointing a boundary spanner – someone who bridges gaps and facilitates communication.²⁹ This could help address concerns and maximise crowdsourcing’s potential beyond information collection. According to Hershkovitz (2020), intelligence organisations must rethink operational processes, secrecy, and data collection to fully embrace crowdsourcing.³⁰ To avoid overwhelming employees, a small-scale trial could be a useful first step, with clear communication of its benefits and challenges to motivate broader participation.

Notes

- ¹ Stottlemeyre, “HUMINT, OSINT, or something new?”, 578–589; Jaeger and Dunn Cavely, “From madness to wisdom”, 329–343; Dover, “Adding value to the intelligence community”, 852–869; and Hershkovitz, “Crowdsourced intelligence”, 42–55.
- ² Brabham, “Crowdsourcing as a model for problem solving”, 75.
- ³ Hershkovitz “Crowdsourced intelligence”, 42–55.
- ⁴ Lowenthal and Marks, “Intelligence analysis”, 662–665.
- ⁵ This chapter is an adapted version of the author’s 2022 master’s thesis, which was submitted for the Master’s program in Military Strategic Studies at the Netherlands Defence Academy (NLDA).
- ⁶ Orlikowski and Gash, “Technological frames”, 174–207.
- ⁷ Byrén, “Internal crowdsourcing for innovation development”, 2.
- ⁸ Coviello et al., “Organizational scaling”, 2–21.
- ⁹ Brabham, “Crowdsourcing as a model for problem solving”, 14.
- ¹⁰ Estellés-Arolas and Ladrón de Guevara, “Towards an integrated crowdsourcing definition”, 189–200.
- ¹¹ Brabham, *Crowdsourcing*, 13.
- ¹² Brabham, *Crowdsourcing*, 13.
- ¹³ Orlikowski and Gash, “Technological frames”, 174–207.
- ¹⁴ Orlikowski and Gash, “Technological frames”, 174.
- ¹⁵ The extensive literature review on this topic can be found in the Master thesis, which provides a more detailed exploration of the debates surrounding crowdsourcing.
- ¹⁶ Brabham, *Crowdsourcing*, 13.
- ¹⁷ For example, Petersen and Vrist Rønn, “Introducing the special issue: Bringing in the public”, 311–316.
- ¹⁸ Hershkovitz, “Crowdsourced intelligence”, 42–55.
- ¹⁹ Tetlock and Gardner, *Superforecasting: The art and science of prediction*.
- ²⁰ Ministerie van Defensie. *Defence vision 2023*, 2023.
- ²¹ Bellaby, “What’s the harm”, 93–117.
- ²² Omand, “Introducing SOCMINT”, 801–823.
- ²³ Vrist Rønn and Søre, “Is social media intelligence private?”, 362–378.
- ²⁴ Jaeger and Dunn Cavely, “From madness to wisdom”, 340.
- ²⁵ Belisari et al., “e-Procurement adoption”, 93–117.

- ²⁶ Djelassi and Decoopman, “Customers’ participation”, 683–692.
- ²⁷ Thuan et al., “Factors influencing the decision to crowdsource”, 47–68.
- ²⁸ Zhao and Zhu, “Evaluation on crowdsourcing research”, 417–434.
- ²⁹ Haas, “Crowding at the frontier”, 1029–1047.
- ³⁰ Hershkovitz, “Crowdsourced intelligence”, 52.

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Scaling military education in wartime

Roy de Ruiter

Abstract

The Russian invasion of Ukraine has been a rude wake up call for Europe. Western armed forces have to prepare for war. This includes Western defence academies, who must now answer a fundamental question: How to operate in wartime? A challenge they have not faced since the Second World War Two. Scholarly attention devoted to this subject has been limited. This chapter aims to help fill this gap. It starts with a historical review of military education during the Second World War. This is compared with Ukrainian experiences and findings from a survey conducted among European joint staff colleges of their preparedness for armed conflict. The chapter concludes with how defence academies can prepare for the various stages of an armed conflict.

Keywords: Scalability; Military education; Military history; PME; War; Adaptation

Introduction

The Russian invasion of Ukraine has been a rude wake up call for Europe. The situation has been a paradigm shift for Western armed forces. For the first time since the end of the Cold War the military has to prepare for war. This transformation applies also to defence academies. It raises fundamental questions: What should be the modus operandi when the bell rings? Scale up military education to support the mobilisation of the armed forces, or (re)deploy the military staff and students to the front? If education continues, what should be the primary focus of the curriculum? Who will teach and study, and how will wartime conditions affect teaching?

These questions are particularly difficult to answer when considering the education of officers. In his seminal work *The Soldier and the State* Samuel Huntington concludes that officers represent the professional nucleus of the armed forces, responsible for the '*management of violence*'.¹ The intellectual component of the military profession necessitates officers to spend a substantial portion of their career in professional military education provided by institutions, such as Joint Staff Colleges (JSC).² However, in war the sustainment of professional military education can be challenging as these experienced and qualified officers are in short supply at the frontline.

For western defence academies, this is terra incognita. The last time they had to face this dilemma was during the Second World War. Consequently, scholarly attention to this problem has been confined to publications shortly after the war and as part of broader reviews of military education and military academies. Though, in the light of recent events in Ukraine, some scholars have begun to analyse the impact of the war on the Ukrainian military educational system.³

This chapter aims to help fill this gap and contribute to a better understanding of scalability of military education. A mixed method approach is used. First, a historical analysis is conducted drawing on an extensive literature review of the *modus operandi* of military education during the Second World War. This is subsequently compared with the recent experiences of the National Defence University of Ukraine (NDUU). Lastly, a survey was held among staff colleges in Europe to understand how they are preparing for a potential armed conflict.⁴ The staff colleges of Germany, Finland, France, the United Kingdom and Ukraine answered the survey. Due to the classified nature of war preparations, not all staff colleges could participate. Other nations, including the Netherlands, were not able to participate, as their preparations for wartime conditions had only just started.

This chapter is divided into three sections. The first section addresses the question of how military educational institutions operated during the Second World War. What lessons learned can be identified? The second section then compares these insights with the recent experiences of Ukraine. The third section delves into the findings of a survey held among staff colleges in Europe. It explores how these institutions anticipate a potential war in Europe. The final section will reflect on the results. What can we learn from the past, the recent Ukrainian experiences, and how these insights can inform defence academies in their preparation for future wars.

Military education in the Second World War

Introduction

The Second World War was the last time military education had to operate under wartime conditions. Based on the comprehensive literature review below the *modus operandi* during the Second World War can roughly be parsed into four distinct stages, each with its unique characteristics and objectives. The first stage is at the outset of hostilities. Priority was to defend the homeland at all costs. Once a country was able to sustain the fight after the initial onslaught, military education was resumed. In this second stage the focus of staff colleges was on augmenting the scaling up of the armed forces. Upon achieving a critical mass of officers, military education entered its third phase. The emphasis shifted towards enhancing the

quality of the officers and the incorporation of lessons learned from the ongoing conflict. This phase was instrumental in ensuring the adaptation of the military to the evolving character of the war. As the conflict neared its conclusion, the fourth stage of operations commenced. Military academies began to prepare for the transition back to peacetime conditions.

Stage 1: Start of the war

10 May 1940, at four o'clock in the morning, midshipmen aboard the lodging ship 'HNLMS Hertog Hendrik', moored in the harbour of Den Helder, were roughly shaken up by anti-aircraft guns firing. Hurriedly getting dressed the midshipmen observed the distinctive markings of the *Luftwaffe* on the aircraft flying overhead and realised this was not a drill. The midshipmen were subsequently assembled and informed that the Netherlands were at war. Unfortunately, it was no longer possible to proceed to their mobilisation locations. A decision was therefore made that they would fortify local defences, prepare shelters, and undertake special duties like guarding German prisoners of war.⁵

Although most European nations had mobilised their armed forces by 1939, the actual attack came as a surprise and shock. In these circumstances all military education stopped. The primary objective was to defend the homeland at all costs. The military staff and students were assigned to their wartime duties, while civilian staff often assumed civil defence roles or sought refuge in shelters. However, as the example above illustrates in the chaos of war, mobilisation locations were often not reachable. Military staff and students were redeployed, as exemplified by the Soviet Union's Frunze Military Academy, which played an instrumental role in the defence of Moscow.⁶

Stage 2: Scale up

After the opening shots of the Second World War had been fired, a significant part of Europe was occupied by Nazi Germany. It was evident that this was going to be a protracted conflict requiring a massive scale up of armed forces. Drawing upon lessons from World War I it was evident that a continuation of military education would be pivotal to maintain the quality of officers and non-commissioned officers.⁷ This was particularly crucial given the challenges posed by illiteracy levels among the population, as literacy is essential for understanding orders and communicating effectively.⁸

Military education therefore quickly resumed. Nations under occupation continued their officer training in unoccupied territories or within their colonies. For example, the French Military Academy, '*École Spéciale Militaire de Saint-Cyr*'

relocated initially to Aix-en-Provence in unoccupied France. When in 1943 Germany also took control of this part of France, the academy was further displaced to French North Africa, Indochina, and the United Kingdom.⁹

The focus on scaling up the number of officers necessitated a significant reduction in the duration of courses. Courses went from one-year to a couple months or even weeks. Working weeks and days were extended, sometimes up to sixteen hours a day. Furthermore, curricula were refined to concentrate on specific duties and immediate operational requirements.¹⁰ The British Royal Military Academy Sandhurst, for instance, shortened its courses to six months, with a primary focus on infantry and armour officers.¹¹

Meanwhile the war continued. Military academies and colleges were subjected to attacks, causing serious damage and casualties – requiring staff and students to participate in local defence, the construction of shelters and rescue parties. To mitigate the risks, courses were dispersed around the nation.¹²

The enormous increase in the number of students put substantial strain on facilities, such as classrooms, accommodation and catering services. To illustrate, during the war 26,707 officers graduated from the Royal Naval College in Greenwich, more than at any point in its history and unthinkable in peacetime conditions.¹³

The situation was further complicated by other responsibilities that were assigned to Military Academies. For example, the president of the United States Naval War College in Rhode Island also oversaw the security and logistical management of New York Harbour, a critical staging area for American military personnel and materiel en route to the European theatre.¹⁴

Stage 3: Sustainment

When around 1943 most Allied armed forces had reached their war strength, the emphasis of military education shifted to the sustainment of the armed forces. Courses that had been temporarily suspended were reinstated, while existing ones were extended within weeks or even months.¹⁵ Staff colleges aimed at the operational and strategic level also resumed their activities in this period. In this context, historian Van Creveld highlights a fundamental distinction between the *Kriegsakademie* in Nazi Germany and the United States War Colleges during the war. Under an authoritarian regime, the education of German officers remained entirely focused on military topics. This made them highly proficient at the tactical and operational level. However, this singular focus proved detrimental at the strategic level, which necessitates a comprehensive understanding of society, economics and politics. This contrast is stark compared to American generals and admirals, who, while being tactically inferior, demonstrated superior strategic capabilities.¹⁶

During this period, academies of occupied countries faced a distinct challenge: a sharp decline in the number of students, as only a few managed to escape occupied Europe. Staff were often redeployed to fulfil war duties.¹⁷

More available time permitted military academies to broaden their curricula, enabling students to gain a better understanding of new technological developments, the ideological underpinnings of the war and international relations. Moreover, lessons learned and new forms of warfare, like air and joint operations, were incorporated as well. In the United States, integrated operations with land, sea and air forces were given high priority. For this reason, the Joint Chief of Staff even established a Joint Army-Navy College in 1943.¹⁸

Military academies also served a critical role in research. The Soviet Frunze Military Academy, for instance, played an important role in analysing the war experiences. The institution used the insights to update regular courses, set up refresher courses and update doctrines and field manuals. This contribution facilitated the rapid recovery of the Russian armed forces.¹⁹

Updating the curriculum proved to be important. This is illustrated by the experiences of the United States Army. The Army Specialised Training Program was successful in quickly raising the number of specialists in fields such as medicine and engineering. However, the army's subsequent failure to adopt the program during the conflict resulted in a mismatch in terms of both quantity and quality during the sustainment phase. A parallel program of the United States Navy proved to be more successful as it maintained a closer alignment with the standard curriculum.²⁰

Stage 4: Scale down

As the war drew to a close, military education institutions began to prepare for the post-war situation. A prime concern was the preservation of hard-won lessons of the war, such as joint warfare.²¹ The American generals Marshall and Eisenhower considered this so important that they strived to supersede the army and navy war colleges with a joint war college after the war.²²

Nations which were subjected to occupation faced problems of a different order. In most instances, military education was suspended during the war. Consequently, a substantial catch-up program was required. This was not only necessary for the military students, but also for the staff, as their knowledge and experience had become outdated. For example, the Dutch Army was compelled to halt all officer education by 1942, following the occupation of the Dutch Indies. The result was an enormous shortage in qualified officers, exacerbated by the need for those who had graduated before the war to undergo refresher courses in modern warfare. Contrastingly, the Dutch Navy continued to educate officers during the

war in the UK and in the US (Marine Corps). As a result, naval officers were much better prepared for the post-war situation, both in experience and in numbers.²³

Despite these challenges resuming military education was accorded a high priority. By 1946, military education had been reinstated in all nations, even in those most devastated by the war, such as the Netherlands.²⁴

The impact of war on military education in Ukraine

The peace that followed the Second World War soon gave way to the Cold War. As it never escalated into a full-scale conflict, the European continent remained relatively peaceful for almost eighty years.²⁵ This all changed with the Russian Federation invasion of Ukraine in 2022. It was a major escalation of the ongoing, albeit relatively localised and low-intensity Russo-Ukrainian conflict that had been simmering since 2014. Interestingly, the Ukrainian approach to military education in response to this escalation mirrors the approach observed during the Second World War, as previously analysed.

Stage 1: Start of the war

The initial stage started when on 24 February 2022 the Russian Federation launched a military offensive against Ukraine. All education was suspended. The majority of the military staff and students were immediately reassigned to military units to defend the nation.²⁶ After intense fighting, the Ukrainian armed forces successfully repelled the Russian troops from the outskirts of Kyiv, and in the autumn of 2022, also from Kharkiv and Kherson Oblast regions in the eastern and southern parts of Ukraine.

Stage 2: Scale Up

The Ukrainian counter-offensive marked the start of stage two. In the autumn of 2022, NDUU, resumed its master's degree programs and leadership courses. The curriculum was adapted to accommodate the scale up of the number of officers.

The leadership courses, newly developed, were reduced in length and structured modularly, with a primary focus on operational planning, humanitarian law, communications and English language proficiency. With the help of the Baltic Defence College these courses were also harmonised with NATO standards.²⁷ Furthermore, these leadership courses facilitated a learning environment where the students and staff with combat experience could share their experiences and knowledge. In order to have combat experience themselves, the military staff are

regularly deployed to combat operations in units aligned with their specialities. The faculty is also engaged in training and mentoring of brigade staff officers.²⁸

The master's degree programmes at the NDUU are designed to prepare officers who have to work at the operational or strategic levels. The strategic program is also open to civilian students. Additionally, the university offers an '*Advanced Courses Catalogue*' comprising short courses, ranging from one week to two months in duration, for both military and civilian students.²⁹

A significant difference from the educational landscape of the Second World War is the presence of the internet, enabling the NDUU to implement a distant learning model utilising platforms like *Microsoft Teams* and *Google Classroom*. This approach, however, is not without challenges, such as unreliable connections due to power supply interruptions. Educators must adapt to asynchronous connections, administer digital exams and authenticate documents. Luckily, the experience of the COVID-19 pandemic provided valuable insights in navigating these challenges.³⁰

Cybersecurity is a paramount concern. This is not a new challenge: Ukraine has been confronted with cyber-attacks since the onset of the hostilities in 2014. To mitigate these risks, the NDUU implements measures, such as the utilisation of 'cold copies' to safeguard against the risk of data being hacked or wiped. Furthermore, servers were relocated to secure locations within the European Union and Japan. The use of backup generators, cloud services (also extended to the library) and alternative means of communications, such as *Starlink* bolstered the resilience of the NDUU communication infrastructure. However, these measures come at a high cost and require additional maintenance.³¹

Stage 3: Sustainment

Another significant difference with the experiences of the Second World War is the constant threat of attacks across the entire nation. All locations within Ukraine are within range of Russian weaponry. To ensure the continuation of the educational processes, institutions have implemented various measures. These include relocating to alternative facilities, constructing shelters, installing backup generators, establishing robust food and water supply chains. Additionally, both military staff and students are trained in local defence, including drone defence, firefighting and damage repair.³²

Ukraine considers all those efforts to sustain military education critical to ensure its enduring capacity to keep on fighting and maintain an intellectual overmatch over the enemy.³³ An integral aspect of this commitment is the continuous adaptation of the armed forces. To this end, the curriculum is frequently updated through the incorporation of daily, weekly and monthly lessons learned reports received from the frontlines. Furthermore, military staff and students share their

own frontline experiences.³⁴ According to the research of Salkutsan and Stolberg, this ongoing adaptation of Ukrainian armed forces has been instrumental in the survival of the Ukrainian state since 2014.³⁵

Also, in the context of Ukraine's dependence on foreign assistance to sustain the war efforts, military education plays a pivotal role. This is partly due to the necessity to understand the Western way of war to effectively deploy Western weapon systems. Furthermore, Ukraine invests extensively in English language training and adaptation of NATO and EU academic standards. This explains why, despite the shortage of personnel, Ukraine keeps sending officers to foreign staff colleges. Not only do they receive training in NATO procedures and thinking, it also supports the sustainment of international support and international partnerships. This works both ways: the NDUU deploys Mobile Training Teams (MTT) to NATO countries to share their hard-won lessons of the conflict.³⁶

While the cessation of hostilities remains uncertain, the NDUU is aware that they need to prepare their personnel for post-conflict situations. From Ukraine's perspective, this would optimally occur as part of NATO and EU memberships. The emphasis on implementing NATO procedures, exchange of students with NATO military academies, adopting EU academic standards, and language training all aim to facilitate this desired future.

The challenge of anticipating for war

When the Ukrainian MTT visited the Dutch Defence College they gave one simple piece of advice: prepare now, before the war starts.³⁷ While this maybe sounds rather straightforward, the survey among defence colleges in Europe indicates that this presents significant challenges.

So, how can defence colleges in Europe prepare for a possible war in Europe? Although the war in Ukraine is geographically relatively proximate, its direct impact on the rest of Europe has yet to be felt. This may explain why many Staff Colleges have just started their preparations or are still in the course of developing these plans.³⁸ Finland is a notable exception. This does not come as a surprise, given its former neutral posture and its complicated relationship with the Russian Federation. While the specifics of their contingency plan are classified, Finland has an operational design for how to continue the professional development of officers under wartime conditions. This plan is consistently updated. Moreover, the Finns are already actively studying the actions of Russia's armed forces to inform and update the curriculum.³⁹

While most plans are still in development, there seems to be no doubt about the necessity to sustain military education in wartime. The United Kingdom's Royal

Air Force (RAF) learned an important lesson during the Gulf War in the early 1990s. Anticipating a protracted and bloody war against Iraq, which at the time possessed one of the world's largest armies, the RAF suspended all training. All pilots were deployed to the frontline to mitigate anticipated losses. In the end, the losses were not as significant as had been feared. Post-conflict, the RAF faced a substantial training gap that persisted for many years.⁴⁰

All nations expect the curricula to shorten and refocus on military operational planning. Also, modular courses and increased utilisation of distant learning are anticipated. As military staff presumably have operational assignments, an increased use of reserve and retired officers is expected. On the other hand, some countries point to the importance of having military staff with battle experience.⁴¹

Certain defence academies, such as the French and Dutch, have their own academic faculties. This can be beneficial for swift adaptation of curricula to operational requirements. Additionally, research conducted by military academies can play a pivotal role in integrating lessons learned from operations into the curriculum and in supporting the learning process of the armed forces.⁴²

Conclusion

The aim of this chapter was to enhance our understanding of the scalability of military education in times of war. While the response to the survey was somewhat limited due to the sensitive nature of the plans and the ongoing development, the insights shared by participating nations underscore the challenge of preparing for an event of such magnitude. This may be partly attributed to the extended duration of relative peace experienced in recent decades. Apparently, the absence of immediate threat can make it difficult to perceive the urgency, let alone comprehend the potential impact of war. The insights gleaned from the war in Ukraine and the Second World War can serve to better understand the impact of war and provide valuable perspectives on possible preparations. Three key trends have been identified.

First of all, military education is a critical pillar in the war effort. It defines and sustains the quality of the military leadership and intellectual edge over the opponent. At the onset of hostilities, military education facilitates rapid scaling up of military units, by providing units with sufficient competent officers. In the later stages of the war, it plays an indispensable role in the sustainment of armed forces. Furthermore, military education provides the foundation for the continuous adaptation of armed forces. It facilitates learning from success and failures, and a better understanding of emerging concepts and technologies. This strategic importance is exemplified by general Marshall's commitment during the Second World War who, even amidst

the urgent mass mobilisation at the start of the war, kept assigning his best officers to military academies.⁴³ The Ukraine armed forces, despite serious constraints in personnel, do the same. It continues to prioritise military education at all levels and keeps sending officers to foreign military academies for advanced training.

The second trend is that education has to adapt and align with the war effort. The key is to strike a balance between the sustainment of well-trained officers and the scalability in terms of personnel numbers. While each conflict presents its unique dynamics, this study identifies four distinct stages of scalability in military education during wartime. Each stage necessitates a different approach and has its own priorities. The first stage is when the hostilities commence. All education stops, as it is all-hands-on-deck to fight for the survival of the state. The second stage commences once the opening shots have been called and the state is able to continue the fight. Military education is resumed. The focus shifts to upscaling, to bring the armed forces up to full strength. Upon achieving full mobilisation, the third stage starts, which aims at the sustainment of the armed forces. This allows military education to place a greater emphasis on quality, including the analysis of lessons learned to continually update and improve curricula. The last stage begins when the end of the conflict approaches. The armed forces begin to scale down and prepare for the post-war situation. During this phase, priority is given to the resumption of normal military education programs as soon as possible and incorporating the lessons learned of the war. After the Second World War, by 1946, all courses had resumed their regular peacetime programs. The duration and details of each stage are, of course, difficult to predict. Nevertheless, being aware of these stages enables military academies to better anticipate and prepare for the impact of the dynamics of war on military education.

Lastly, in light of the aforementioned trends, it is imperative that contingency planning be undertaken, encompassing the four stages. The experiences of the Second World War and the current conflict in Ukraine, underline that such plans should have a wide scope and include critical aspects such as infrastructure, electric power supply, shelters and alternative locations for education. In addition, the digital era necessitates the integration of robust platforms for distant learning, reliable means of communications and cyber defence measures. These preparations, such as cold copies of data, are best done prior to the onset of hostilities. In this respect, wargaming different scenarios and realistic exercises can serve as invaluable instruments in this preparatory process.

The Second World War demonstrated the strategic impact of high-quality military education. The historian Williamson Murray cites the American Fleet Admiral Chester Nimitz: 'I credit the Naval War College for such success [as] I achieved in strategy and tactics in the war'.⁴⁴ Murray observes a direct correlation between military organisations that innovate intelligently in peacetime and those who are

able to adapt successfully in conditions of war.⁴⁵ This study suggests that this also applies to the scaling of military education.

Managerial Implications

1. Prepare now! While this may present challenges under daily operational pressures, this study shows that it is prudent to undertake this endeavour in peacetime. It is essential to take into account second-order effects. Furthermore, consider investing in wargaming and exercises, such as an offline week, to ensure readiness and resilience.
2. In wartime, military education remains an indispensable component of the overall war effort, as evidenced by the experiences of Ukraine, historical precedents, and the survey.
3. While each conflict presents its unique dynamics, this study identifies four distinct stages of scalability in military education during wartime. Each stage necessitates a different approach and has its own demands. The four stages are: start of the war – scaling up – sustainment – scale down.
4. Military academies play an indispensable role in the adaptability of armed forces. To facilitate this, they should be part of the learning process of the armed forces. This can be accomplished through inclusion in frontline reports and by establishing regular exchanges between the military-academic staff and frontline units. Furthermore, consider the establishment of dedicated academic research teams to delve into topics, such as logistics, enemy tactics, concept development, and emerging technologies.

Notes

- ¹ This distinguishes enlisted men and women from officers. They are specialised in the application of violence. Samuel P. Huntington, *The soldier and the state*, 11 and 18.
- ² Huntington, *The soldier and the state*, 13.
- ³ Serhii Salkutsan and Al Stolberg, “The impact of war on the Ukraine military education system”; Anastasiia V. Sibruk et al., “Ukrainian education system: War challenges”.
- ⁴ For security reasons the responses from both the Survey and the NDUU are made anonymous.
- ⁵ V. J. L. Blom and Enys Comité, *Gedenkboek Enys House, 1940–1946: het Koninklijk Instituut voor de Marine gedurende de Tweede Wereldoorlog* (Bonneville, 1992), 6–7.
- ⁶ Wim Klinkert and Petronella M.H. Groen, *Studeren in uniform 175 jaar Koninklijke Militaire Academie 1828–2003* (Sdu Uitgevers, 2004), 257–258; Harry W. Dickinson, *Wisdom and war: The Royal Naval College Greenwich 1873–1998*, 113; William E. Simons, *Professional military education in the United States: A historical dictionary*, 146.

- ⁷ During World War I this insight led the United States army to set up schools in France to prepare officers and non-commissioned officers for war. Judith H. Stiehm, *The U.S. Army War College: Military education in a democracy*, 30.
- ⁸ Denis Ryan, "Education in the British Army", 78; Dickinson, *Wisdom and war*, 191.
- ⁹ Simons, *Professional military education in the United States*, 132–133; The Dutch also intended to educate their officers in the Dutch Indies. Temporarily the Dutch navy rented an estate on the south coast of England to train a substantial number of midshipmen who managed to escape on board naval vessels. However, this became a permanent solution after the Japanese occupation of the Dutch Indies. Willem Bevaart, *De gouden zon: de hogere vorming van officieren der Koninklijke Landmacht, 1868–1992* (Sdu uitgeverij Koninginnegracht, 1995), 108; Blom and Enys Comité, *Gedenkboek Enys House, 1940–1946*, 37
- ¹⁰ Richard Woff, "Educating the Soviet Armed Forces: A contemporary view", 132; Cynthia A. Watson, *Military education: A reference handbook*, 48; Arthur T. Coumbe, *Army officer development: Historical context*, 3; Anson D. Marston, "Wartime role for colleges and universities", 134; John W. Masland and Laurence I. Radway, *Soldiers and scholars: Military education and national policy*, 100; Simons, *Professional military education in the United States*, 215; John T. Farquhar, "Sustaining disruption, The creation of the Air University and the Air Force Academy", 48.
- ¹¹ Simons, *Professional military education in the United States*, 265, 267; John B. Hattendorf et al., *Sailors and scholars: The centennial history of the U.S. Naval War College*, 167.
- ¹² Dickinson, *Wisdom and war*, 188, 174 en 181; Blom and Enys Comité, *Gedenkboek Enys House, 1940–1946*, 41–42.
- ¹³ Dickinson, *Wisdom and war*, 188, 174 and 190; Hattendorf et al., *Sailors and scholars*, 171–172.
- ¹⁴ Hattendorf et al., *Sailors and scholars*, 168, 171, 171–172.
- ¹⁵ For example, the Royal Navy Staff Course was suspended in 1939 and resumed in 1943 with an eight-week course. In the beginning of 1945 the course was gradually extended to six months. Dickinson, *Wisdom and war*, 188; Simons, *Professional military education in the United States*, 188.
- ¹⁶ Martin Van Creveld, *The training of officers: From military professionalism to irrelevance*, 33–34.
- ¹⁷ Blom and Enys Comité, *Gedenkboek Enys House, 1940–1946*, 176.
- ¹⁸ Marston, Wartime role for colleges and universities, 138; Stiehm, *The U.S. Army War College*, 34; Watson, *Military education*, 48; Simons, *Professional military education in the United States*, 43–44; Hattendorf et al., *Sailors and scholars*, 174.
- ¹⁹ Woff, "Educating the Soviet Armed Forces", 132–133; After the war the Frunze Military Academy continued this tradition of operational research influencing thinking about warfare at the operational level. Simons, *Professional military education in the United States*, 146.
- ²⁰ Marston, "Wartime role for colleges and universities", 134, 136; Masland and Radway, *Soldiers and scholars*, 100.
- ²¹ Coumbe, *Army officer development*, 3 and 7; Hal M. Friedman, *Digesting history: The U.S. Naval War College, the lessons of World War Two, and future naval warfare, 1945–1947* (United States Dept. of Defense, 2010), xxiii; Marston, "Wartime role for colleges and universities", 103.
- ²² Resistance from the services prevented the abolishment of the service academies. In the end, a National Defence University (NDU) was founded in Washington in coexistence with the army, navy and air force war colleges; Stiehm, *The U.S. Army War College*, 34.
- ²³ Blom and Enys Comité, *Gedenkboek Enys House, 1940–1946*, 177; Bevaart, *De gouden zon*, 111 en 155; J. Hoogenboezem, *H.J. Kruls: Een politieke generaal*, 207.
- ²⁴ Dickinson, *Wisdom and war*, 190; Erik R. d'Engelbronner, *Negentig jaren Stafschool, Krijgsschool en Hogere Krijgsschool 1868–1958* (Vereniging ter Beoefening van de Krijgswetenschap, 1958), 28–29; Simons, *Professional military education in the United States*, 43–44, 50, 188, 265–267; Jan J. Leeflang,

- Pieter L. Bakker, and Gerardus M.W. Acda, *Gedenkboek 1904–2004 Koninklijk Instituut voor de Marine* (De Nieuwe Haagsche, 2004), 51.
- ²⁵ Notably exceptions are of course the breakup of Yugoslavia and the war in Kosovo. While these wars were intense and with great loss, the current conflict in Ukraine stands out as the most violent and deadly conflict in Europe since the conclusion of the Second World War.
- ²⁶ Representative National Defence University Ukraine, *Survey: The modus operandi of Joint Staff Colleges in wartime*, email to author, September 13, 2024.
- ²⁷ Representative Baltic Defence College, email to author, January 7, 2025. See also, www.baltdefcol.org/news/baltic-defence-college-and-national-defence-university-of-ukraine-signed-the-memorandum-of-understanding.
- ²⁸ Representative National Defence University Ukraine, September 13, 2024. Presentation representative of Ukraine War Lessons Learned Mobile Training Team, November 11, 2024, Breda.
- ²⁹ Representative National Defence University Ukraine, September 13, 2024.
- ³⁰ Gresha Viktor et al., “Universities in times of war: Challenges and solutions for ensuring the educational process”, 82, 84; Representative National Defence University Ukraine, September 13, 2024. Presentation representative of Ukraine War Lessons Learned Mobile Training Team, November 11, 2024, Breda.
- ³¹ Starlink has been replaced by other systems. Viktor et al., “Universities in times of war”, 84–86; Presentation representative of Ukraine War Lessons Learned Mobile Training Team, November 11, 2024, Breda.
- ³² Salkutsan and Stolberg, “The impact of war on the Ukraine military education system”, 74–75; Viktor et al., “Universities in times of war”, 80–81; Presentation representative of Ukraine War Lessons Learned Mobile Training Team, November 11, 2024, Breda.
- ³³ Salkutsan and Stolberg, “The impact of war on the Ukraine military education system”, 74–75.
- ³⁴ Presentation representative of Ukraine War Lessons Learned Mobile Training Team, November 11, 2024, Breda.
- ³⁵ Salkutsan and Stolberg, “The impact of war on the Ukraine military education system”, 69.
- ³⁶ Viktor et al., “Universities in times of war”, 8; Salkutsan and Stolberg, “The impact of war on the Ukraine military education system”, 70–73; Presentation representative of Ukraine War Lessons Learned Mobile Training Team, November 11, 2024, Breda; Representative Baltic Defence College, email to author, January 7, 2025.
- ³⁷ Presentation representative of Ukraine War Lessons Learned Mobile Training Team, November 11, 2024, Breda, also Representative National Defence University Ukraine, September 13, 2024.
- ³⁸ Representative Führungsakademie der Bundeswehr, *Survey: The modus operandi of Joint Staff Colleges in wartime*, email to author, October 9, 2024. Representative Ecole de Guerre, *Survey: The modus operandi of Joint Staff Colleges in wartime*, email to author, May 5, 2024; Representative Joint Command and Staff Course, *Survey: The modus operandi of Joint Staff Colleges in wartime*, email to author, September 12, 2024.
- ³⁹ Representative Finnish National Defence University, *Survey: The modus operandi of Joint Staff Colleges in wartime*, email to author, July 3, 2024.
- ⁴⁰ Representative Joint Command and Staff Course, September 12, 2024.
- ⁴¹ Representative Führungsakademie der Bundeswehr, October 9, 2024; Representative Ecole de Guerre, May 5, 2024; Representative Joint Command and Staff Course, September 12, 2024; Representative Baltic Defence College, *Survey: The modus operandi of Joint Staff Colleges in wartime*, email to author, June 3, 2024.
- ⁴² Representative Ecole de Guerre, May 5, 2024.
- ⁴³ Williamson Murray, *War, strategy, and military effectiveness*, 308.

- ⁴⁴ Williamson Murray, "Does military culture matter?", 143.
- ⁴⁵ Murray, *War, strategy, and military effectiveness*, 22; Williamson Murray and Allan R. Millett, *Military innovation in the interwar period*, 327.

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Scalability of NATO armed forces from a financial-economic perspective: A preliminary descriptive account

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Abstract

This chapter examines the scalability of the armed forces from a financial-economic perspective. We compare North Atlantic Treaty Organisation (NATO) member states' fluctuations in defence spending during 1980–2024. This contributes to a better understanding of the urgency for up- and downscaling capacities and the duration of the scaling process. Subsequently we investigate what NATO states have been up- or downscaling by analysing the distribution of defence expenditures of personnel and equipment. The results show that the spending pattern (distribution across the different categories) of some states remains the same over a longer period, while the spending pattern of other states is more volatile. The main finding is that up- and downscaling is mainly realised by increasing and decreasing expenditure on equipment.

Keywords: Defence economy; NATO; Burden sharing; Scaling; Defence expenditures

Introduction

Although the majority of North Atlantic Treaty Organisation (NATO) governments agree on the necessity of continued support to Ukraine in its fight against Russia in the foreseeable future, many remain inadequately adapted to wartime demands.¹ Years of collecting the so-called peace dividend have had detrimental consequences for defence. Many NATO countries failed to meet the two per cent Gross Domestic Product (GDP) defence spending target set by NATO allies, weakening national defence industries and limiting their ability to respond effectively to emerging threats.² The current situation underscores a critical reality. Within NATO, responses to specific threats or wars, such as the conflict in Ukraine, are expected to prompt an upscaling of defence capabilities, including increased investments in expenditure on personnel and equipment. However, while such responses might

seem intuitive, there remains a significant gap in research exploring the extent, timing, and effectiveness of these adjustments across member states.

Following the end of the Cold War, NATO countries reduced their defence budgets, reflecting a widespread perception of diminished military threats. In this period resources were re-allocated from military expenditures to domestic programs. This shift led to a period of minimal military engagement, a trend well-documented in the literature.³ However, the rise of new security challenges has exposed the limitations of this strategy, forcing a re-evaluation of defence priorities.

The need for European countries to abandon the peace dividend and enter an era of strategic autonomy has been amplified after President Donald Trump called for European countries to take responsibility for defending themselves if they do not contribute equally,⁴ and if they wish to maintain the US commitment to NATO. Yet, it is not merely Trump's rhetoric that has triggered this shift. In the past two years war entered European territory, making the war in Ukraine a central topic on the European security agenda.

The chapter explores the patterns of scaling up and scaling down in national defence across NATO countries, particularly in terms of total defence, personnel, and equipment expenditures. It will examine from a financial-economic perspective how governments adjusted their defence policies during periods of heightened or diminished threats. By analysing the dynamics of downscaling that characterised the post-Cold War period and the scaling up in response to emerging security challenges – such as the war in Ukraine – the chapter aims to provide a better understanding of NATO states' urgency for upscaling and downscaling capacity and the duration of the scaling process. Subsequently, it investigates what NATO states have been upscaling and downscaling by analysing total defence expenditure and the distribution of defence expenditures by the main categories of personnel and equipment.

The remainder of this chapter is structured as follows. The next section develops a working definition of scalability that we use in our chapter. The third section explains the research methods and outlines the data sources. The fourth section presents our results. The final section provides a synthesis and a conclusion.

Scalability

Scalability has become the new buzzword in both the private and public sector, including the armed forces. Scientific literature on scalability reveals various definitions and sometimes its meaning is only implied.⁵ Research on scalability of the armed forces emphasises the importance of designing scalability as a core feature, not just a response to emergencies.⁶ This section investigates how prior work of

scholars and NATO define the concept of scalability to guide our research on when and how scaling happened within NATO. Since there is less scientific literature on the scalability of the armed forces, we primarily use NATO guidelines and national policy documents to both define scalability and explain related concepts.

Table 16. 1: NATO scalability: a narrow and broad definition

		TIME HORIZON	
		Short term	Long term
SCOPE	Size	Scalability (in a narrow sense)	Expandability
	Response	Flexibility	Adaptability

Source: NATO (2022a; 2023a; 2023b; 2024c; 2024d)

NATO does not have a single definition of scalability or scalable forces that is used in all its documents. However, the term is often referenced in relation to the alliance’s ability to rapidly adjust the size, capability and deployment of its forces to meet new security challenges.⁷ Moreover, scalability is frequently used in combination with terms such as flexibility, expandability and adaptability.⁸ While these terms all describe the ability to change or adjust to meet various conditions, they have nuanced differences in meaning, especially in a military context. Table 16.1 provides an overview of key terms used by NATO to describe scalability in a narrow and in a broad sense.

Scalability (in a narrow sense) refers to a military unit’s ability to quickly adjust its size in response to changing threats.⁹ This can relate to both a change in the size of the armed forces and the resources required (e.g., ammunition). Flexibility also involves short-term changes, but with a greater focus on adjusting responses rather than altering size. Flexibility concerns the ability of a military unit to respond quickly and effectively to changing circumstances, regardless the scale of the operation.¹⁰ Being flexible means that the military can rapidly shift strategies or tactics if the environment requires it. Both expandability and adaptability involve long-term changes. The former is more focused on changes in size. While the latter emphasises changes in response. Expandability points to the military’s ability to increase the capacity of existing units by adding more resources, personnel, or technological capabilities, typically with a long-term focus;¹¹ for example, the decision by the Dutch government to expand the existing capacity of Joint Strike Fighters.

However, the most common usage of expandability in NATO discourse refers to the idea that the alliance can grow in terms of membership. On April 4, 2023, Finland and Sweden became NATO members as a direct response to the changing security environment in Europe. Adaptability concerns the military's ability to effectively respond to changes in the environment, including unforeseen circumstances or new threats.¹² It goes beyond flexibility by involving not only changes in strategy or tactics but also adjustments to the organisation itself, such as through the acquisition of new technology. Technologies like artificial intelligence, autonomous systems, biotech and quantum are changing the character of conflict. According to former Secretary General Jens Stoltenberg, NATO should for this reason constantly sharpen its technological edge by developing and adopting new technologies.¹³

In this chapter, we analyse how the armed forces of various NATO countries have adapted to changing threats from a financial-economic perspective, using NATO defence expenditure data from 1980 to the present. These figures do not offer direct insight into how NATO countries adapt to changing threats. In practice, countries may display various behaviours simultaneously in response to evolving threats. For example, after Russia's invasion of Ukraine in February 2022, NATO's reaction was shaped by both short-term (scaling up the armed forces ensuring Ukraine's survival and deterring further Russian aggression) and long-term actions (expanding and adapting the armed forces by new investment for a more robust and credible defence posture).

For this reason, in this chapter we use the term scalability in its broadest sense (see Table 16.1). Where relevant we will explore in more detail the specific behaviours of NATO states.

Methodology

In this section we provide an overview of the parameters we selected to measure the up- and downscaling of NATO states. Table 16.2 presents the investigated time period, data sources, and subsequent tables that summarise our findings.

Defence spending is typically measured in two ways: the absolute defence spending and the relative defence spending (as a percentage of GDP). The first reflects the overall increase in military expenditure, while the second illustrates the economic burden of military spending. We used the second measure because this parameter standardises comparisons between countries, takes economic differences into account, and offers a better understanding of how each state prioritises defence in relation to its economy. The same applies to both the equipment and personnel parameters. Using the parameters equipment and personnel spending as a percentage of total defence spending standardises comparisons,

highlights priorities, and offers deeper insights on NATO states' scaling strategies, regardless of changes in overall defence budgets. The last parameter measures the number of military and reserve personnel and different forms of conscription to assess whether this provides additional insights on the scaling strategies of NATO members.

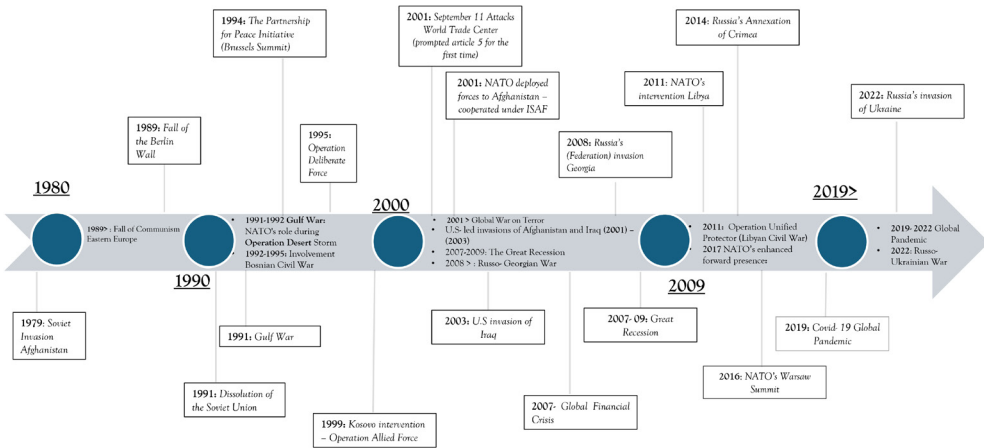
Table 16.2: Overview parameters

Dimension	Measures	Period	Source	Results
Defence	Relative defence expenditure (% of GDP)	1980–2023	SIPRI (2024)	Table 16.3
Equipment	Relative equipment expenditure (% of defence expenditure)	1980–2024	NATO (2024f)	Table 16.4
Personnel	Relative personnel expenditure (% of defence expenditure)	1980–2024	NATO (2024f)	Table 16.5
Personnel	Numbers of military personnel, reserve personnel and forms of conscription	1980–2023	IISS (1981–2024)	Appendices 1, 2 and 3

Results

This section presents an analysis of the up- and downscaling behaviour of NATO member states, focusing on their defence contributions within the framework of collective security. We first examine the behaviour of NATO countries in relation to significant security events during 1980–2024. To gain a deeper understanding, a timeline is included that outlines significant security events in this period (see Figure 16.1). The first part focuses on the specific moments, triggers, and the pace of countries increasing and decreasing their defence budgets. It tries to answer the questions such as when did up- and downscaling occur; what were the triggers for scaling defence budgets; at what pace did these changes occur, and what do they indicate; were these changes consistent across countries or varied by country and were there any instances of long-term increases in defence spending? The second part investigates what NATO member states have been up- and downscaling by analysing the distribution of defence expenditures by the main categories of equipment and personnel expenditures.

Figure 16.1: Timeline of significant security events 1980–2024



NATO's up- and down scaling behaviour

NATO defence budgets have fluctuated over time, partly in response to the geopolitical environment. As scalability from a financial-economic perspective refers to the ability of NATO members to rapidly scale up or down defence spending in response to perceived threats, the clearest example of downscaling occurred at the end of the Cold War. During the 1980s and 1990s, defence budgets were notably scaled down (see Table 16.3 Column [Change period 1–2]). In line with the dissolution of the Soviet Union and the almost complete absence of military threats on NATO territory, many countries tended to decrease investment in their security.¹⁴ This reflects the reduced perceived threat after the Cold War ended in 1991 and the subsequent peace dividend.¹⁵ In the aftermath of the Cold War, NATO expanded in terms of membership but also adapted by downsizing traditional Cold War-era forces while investing in more flexible, rapid response capabilities.

Other perceived threats such as the Global War on Terror, which began in the aftermath of the September 11, 2001 attacks did not correlate with significant increases in defence spending. Between periods 2 and 3, defence budgets were reduced across all NATO member states (see Table 16.3 Column [Change period 2–3]). ISAF was a NATO-led mission, and the US sought to distribute the operational and financial burden among its allies.¹⁶ Almost all NATO countries contributed to the ISAF mission. By sharing this burden, it was not necessary to increase individual defence spending. It is also worth noting that counterinsurgency operations, like the one in Afghanistan, rely more on intelligence and special operations than on large-scale conventional deployments; these operations did not demand the

large-scale conventional force expenditures typical of the Cold War. While these new challenges required more flexible forces, they did not necessitate expanding or radically adapting NATO's overall structure.

Next, the Global Financial Crisis (2008–2011) exerted significant influence on national economies, which negatively affected NATO member states' defence expenditures. With the arrival of the financial crisis, budget cuts in both the US and the EU became increasingly wide in public services, while initially sparing their ministries of defence.¹⁷ However, as the crisis deepened, many countries were forced to reduce their defence budgets, including the largest European NATO members the United Kingdom (UK), France, Germany and Italy. As reflected in the numbers, this resulted in a modest downscaling in defence budgets, with many countries showing a decline between period 3 and 4 (see Table 16.3 Column [Change period 3–4]).

It was not until the annexation of Crimea in 2014 that a consistent growth in defence budgets became evident across Europe, somewhat increasing expenditures in response to rising security concerns.¹⁸ The consistent growth in defence budgets across Europe reflects NATO's reaffirmation of the two per cent GDP defence spending target at the 2014 Wales Summit. However, the pace and scale of growth vary significantly by country. Eastern European countries, such as Latvia and Lithuania, showed the most significant increases driven by their geographic proximity to Russia and heightened threat perceptions (see Table 16.3 Column [Change period 4–5]). Eastern European states rapidly scaled up budgets, while Western Europe's response remained more cautious, reflecting ongoing disparities in defence priorities within the alliance.

Many Western European nations, including Germany, Italy, the Netherlands and Spain slightly scaled down budgets. However, the most significant reductions in defence budgets are observed in the US and the UK. This could be explained by several reasons. By 2014, the US had vastly reduced its overseas operations, which was also observable in the case of the UK – particularly in Afghanistan. In 2014, the final phase of the UK's combat operations in Afghanistan, also known as Operation Herrick, came to an end. As of the 31st of December 2014, the British handed over control to the Afghan security forces.¹⁹ The same year, in response to an early transition in Afghanistan, Afghan forces took the lead in security responsibility, and NATO subsequently handed over control to the remaining 95 districts. President Obama announced the US coalition's focus shifts to military training and its timetable for withdrawing US forces by the end of 2016, further affecting any post-2014 US troop presence.²⁰ The UK 2015 Strategic Defence and Security Review prioritised efficiency, resulting in personnel reduction and downscaling of conventional capabilities.²¹

Russia's invasion of Ukraine in 2022 appears to have triggered a collective response from NATO member states.²² With the notable exceptions of Bulgaria and Turkey, from 2020 until 2023 all NATO member states increased their defence spending (see Table 16.3 Column [Change period 5–6]). However, the increase occurred at varying scales. Greece, along with several Eastern European countries, show significant increases in their defence budgets. Many Eastern European states have assigned defence a much higher priority in their budgets due to their geographic proximity and historical experience with Soviet dominance and therefore differ significantly from their Western counterparts. For instance, Poland demonstrates a sustained commitment to defence by maintaining a high percentage of GDP spending, which increased further post-2014, reaching an average spending of 2.65 per cent in the period 2020–2023.

In contrast, Turkey represents a unique case as it consistently maintained high defence spending throughout the post-Cold War era underlining its strategic position at the intersection of Europe, the Middle East, and the Black Sea.²³ Unlike Western European countries, which scaled down during the peace dividend era, Turkey has consistently demonstrated alignment with NATO's 2 per cent target. Conversely, while overall European countries increased their spending in response to Russia's invasion of Ukraine, the data shows that Turkey's defence spending as a percentage of GDP decreased to 1.76 per cent in 2020–2023 (see Table 16.3 Column [Change period 5–6]). This can be explained by multiple reasons. Partly because Turkey does not view Russia's aggression in Ukraine as an immediate existential threat to its borders nor security. Its president, Tayyip Erdogan, continues to maintain close ties with Russia's President Vladimir Putin, aligning itself a strategic and reliable partner of Russia. Turkey furthermore has faced some significant economic challenges in recent years which possibly strained the government's ability to maintain high levels of defence spending.

The above provides an overview and analysis of the up and down scaling behaviour of NATO member states and possible triggers for scaling defence budgets. However, it does not offer insight into how states adjust their military assets. The next part of this section provides a more in-depth analysis answering the question of how NATO member states scale up and down.

Table 16.3: Defence expenditures as a percentage of GDP (1980–2023)

Period	1	2	Change	3	Change	4	Change	5	Change	6	Change
	1980-1989	1990-1999	Period 1-2	2000-2009	Period 2-3	2010-2014	Period 3-4	2015-2019	Period 4-5	2020-2023	Period 5-6
Albania				1.48		1.47	-0.02	1.16	-0.30	1.37	0.21
Belgium	3.00	1.73	-1.26	1.18	-0.55	1.03	-0.15	0.89	-0.14	1.11	0.22
Bulgaria				2.38		1.41	-0.97	1.66	0.25	1.64	-0.02
Canada	1.98	1.59	-0.39	1.16	-0.43	1.10	-0.06	1.25	0.15	1.29	0.04
Croatia				2.09		1.70	-0.38	1.63	-0.07	1.81	0.18
Czechia				1.64	-0.30	1.06	-0.57	1.03	-0.04	1.41	0.38
Denmark	2.20	1.76	-0.44	1.41	-0.35	1.29	-0.12	1.19	-0.09	1.50	0.31
Estonia				1.61		1.82	0.22	2.03	0.21	2.34	0.31
France	3.12	2.53	-0.59	2.03	-0.51	1.89	-0.14	1.88	-0.01	1.97	0.10
Germany	2.86	1.68	-1.18	1.26	-0.42	1.21	-0.05	1.17	-0.04	1.40	0.22
Greece	4.71	3.48	-1.22	2.94	-0.54	2.49	-0.45	2.59	0.10	3.55	0.96
Hungary				1.40	-0.34	0.98	-0.42	1.09	0.11	1.76	0.67
Italy	1.97	1.70	-0.27	1.62	-0.08	1.42	-0.20	1.31	-0.10	1.68	0.37
Latvia				1.45		0.99	-0.46	1.63	0.64	2.15	0.52
Lithuania				1.18		0.82	-0.37	1.66	0.84	2.30	0.64
Luxembourg	0.97	0.69	-0.28	0.54	-0.15	0.38	-0.16	0.47	0.09	0.61	0.14

Period	1	2	Change	3	Change	4	Change	5	Change	6	Change
	1980-1989	1990-1999	Period 1-2	2000-2009	Period 2-3	2010-2014	Period 3-4	2015-2019	Period 4-5	2020-2023	Period 5-6
Montenegro								1.38		1.63	0.26
Netherlands	2.78	1.92	-0.87	1.40	-0.51	1.24	-0.17	1.20	-0.04	1.43	0.23
N-Macedonia										1.51	
Norway	2.77	2.47	-0.30	1.68	-0.79	1.44	-0.23	1.68	0.23	1.70	0.02
Poland	2.17	2.17		1.88	-0.29	1.84	-0.04	2.00	0.17	2.65	0.65
Portugal	1.92	1.66	-0.26	1.47	-0.20	1.43	-0.04	1.36	-0.06	1.47	0.10
Romania				1.93		1.26	-0.68	1.65	0.39	1.80	0.15
Slovakia				1.65		1.07	-0.58	1.25	0.18	1.87	0.62
Slovenia				1.41		1.22	-0.19	0.99	-0.23	1.23	0.24
Spain	2.67	1.94	-0.72	1.45	-0.49	1.33	-0.12	1.22	-0.11	1.42	0.19
Türkiye	3.61	3.83	0.22	2.87	-0.96	2.02	-0.85	2.23	0.20	1.76	-0.47
UK	4.96	3.20	-1.76	2.46	-0.74	2.39	-0.07	1.98	-0.41	2.14	0.16
US	6.16	4.14	-2.02	3.91	-0.23	4.38	0.47	3.38	-1.00	3.44	0.07
Average NATO	3.05	2.23	-0.81	1.76	-0.47	1.51	-0.25	1.53	0.03	1.79	0.26

Source: SIPRI. "Military expenditure data (1980-2023)." (2024).

How NATO scales up and down in terms of equipment

Table 16.4 presents NATO states' defence spending behaviour on equipment. On average, NATO countries allocated 19 per cent of their defence expenditures to equipment from 1980 to 2024 (see Table 16.4 Column [Period 1980–2024; mean]). Belgium, Portugal, and Slovenia are among the countries that invest significantly less in equipment. France, North Macedonia, Norway, Turkey, the UK, and the US invest more in equipment than the NATO average over this period. Finland and Sweden also score highly; however, their average is exclusively derived from the period 2020–2024, owing to their recent accession to NATO.

The analysis of the standard deviation also uncovers interesting insights (see Table 16.4 Column [Period 1980–2024; SD]). Despite the shifting security landscape, Canada, Denmark, France, Germany, Italy, Norway, the UK, and the US maintained relatively stable equipment spending over the course of the period 1980–2024. Most of these countries have large defence industries, which partly explains their consistent spending behaviour on equipment. This indicates that in order to keep these industries viable, governments need to allocate substantial funds to ensure continued demand for military equipment. The spending patterns of Bulgaria, Hungary, Luxembourg, and Poland show more fluctuations. Bulgaria significantly reduced its equipment due to economic challenges and budgetary constraints during the period 2010–2014.²⁴ The standard deviations of Hungary, Luxembourg and Poland can be attributed to the rise in defence spending following Russia's annexation of Crimea. These countries have scaled up their investments in equipment to a greater extent than other NATO members after 2014.

To further examine the up-and-downscaling behaviour in equipment spending, we calculated the percentage changes between different time periods. In periods 1–4, states display dissimilar patterns of behaviour (see Table 16.4 Columns [Change period 1–2; 2–3; 3–4]). Some increase, while others decrease their spending on equipment. For example, western European states saw the opportunity to reduce military spending in the Post-Cold War era (1990–1999) as the large-scale military build-up was no longer necessary. This resulted in a decrease of equipment spending. The figures for Greece and Turkey reveal an opposite trend, as both countries show an increase in relative equipment spending, driven by national security threats (see Table 16.4 Columns [Change period 1–2]). In the subsequent period 2000–2009, cuts in material expenditure stabilise. Western European states appear to allocate relatively more funds to defence equipment as states began to develop flexible and rapid-deployment capabilities (see Table 16.4 Columns [Change period 2–3]). Despite budget cuts across all NATO countries during this period, most states nonetheless increase their relative defence spending on military equipment. In 2010–2014, further defence budget cuts occur, due to the financial crisis, resulting in

relatively less spending on equipment (see Table 16.4 Columns [Change period 3–4]). After Russia's annexation of Crimea, NATO members agreed at the Wales Summit in September 2014 to spend at least 20 per cent of their defence expenditures on investments in 2024 as part of a broader effort to modernise their military capabilities.²⁵ And indeed, in the period 2015–2019 the majority of NATO states raised their defence spending on equipment. The only exceptions were Albania, Croatia, France, Germany and Slovenia (see Table 16.4 Columns [Change period 4–5]).

During the period 2020–2024 most NATO member states further increased their defence spending on equipment. An increase in material expenditures is evident. Given the sharp growth, we suggest that this is not a temporary up-scaling of equipment, but rather an expansion and adaption of NATO to deal with the renewal of the Russian threat. NATO is again preparing for a conventional threat, comparable to the Cold War. Due to this significant increase of equipment expenditures, with a few exceptions, all NATO member states allocated over 20 per cent of its defence budget to equipment in 2024 (see Table 16.4 Columns [Change period 4–6]).

Table 16.4: Percentage of total defence expenditure on equipment

Period	Change period		Change period		Change period		Change period		Change period		Period 1980-2024		
	1 1980- 1989	2 1990- 1999	3 2000- 2009	4 2010- 2014	5 2015- 2019	6 2020- 2024	Change period 4-5	Change period 5-6	Mean	SD	Min	Max	
Albania			11	15	4	10	-5	24	14	16	9	7	47
Belgium	13	7	-6	5	-2	7	2	18	11	9	4	3	20
Bulgaria			19	6	-13	18	12	19	1	16	13	1	60
Canada	19	15	-4	13	-2	12	1	14	2	14	3	8	20
Croatia			10	11	1	6	-5	24	18	13	9	3	31
Czechia			17	11	-6	12	1	25	13	16	6	7	38
Denmark	15	14	-1	11	-4	13	2	19	6	15	3	9	30
Estonia			16	14	-2	16	2	24	8	18	6	10	34
Finland								44		44	2	43	46
France			21	28	7	24	-4	28	4	24	4	20	31
Germany	20	12	-7	15	3	13	-2	20	7	16	4	9	29
Greece	19	21	2	15	-6	12	2	30	18	18	7	6	42
Hungary			12	10	-2	18	8	43	25	19	13	6	48
Italy	19	14	-4	11	-1	17	6	22	5	16	4	9	23
Latvia			10	11	1	20	9	27	7	18	9	5	37
Lithuania			17	11	-6	32	21	28	-4	22	9	9	38

How NATO scales up and down in terms of personnel

Unlike defence expenditures on investments, there exists no NATO guideline on how much of the defence budget should be spent on personnel. NATO countries allocate on average 52 per cent of their defence expenditures to personnel in the period from 1980 to 2024 (see Table 16.5 Column [Period 1980–2024; mean]). Estonia and the two most recent NATO members Finland and Sweden spend significantly less than NATO average on personnel. However, the personnel expenditures of Portugal and Croatia are significantly above the average. Besides these two, the countries in the South of Europe and the Balkans all spend more than the NATO average on personnel. The standard deviation over the entire period shows three countries, Canada, Norway and the UK, with a relatively stable pattern of spending on personnel (see Table 16.5 Column [Period 1980–2024; SD]).

To examine the up-and-downscaling behaviour in personnel spending, we calculated the changes between different periods and the standard deviation over the different time periods. During period 1 and 2 (i.e., the period after the fall of the Berlin Wall and the end of the Cold War) the average personnel expenditure of NATO countries increases 4 per cent. It should be noted that this refers to relative personnel expenditures. This means that NATO increased its personnel expenditures compared to other expenditures, but it may have reduced its absolute spending on personnel. During this period the share of personnel expenditure is only declining in three countries, with Norway showing the largest decline (see Table 16.5 Column [Change period 1–2]). When examining the changes in absolute numbers of military personnel we see a different pattern. Instead of a rise in relative expenditures on personnel, Appendix 1 Column [Change period 1–2] reveals a decline of 13 per cent in the period after the Cold War and this decline in military numbers applies for all member states.

Comparing period 2 (1990–1999) and 3 (2000–2009) NATO countries slightly decrease their share of personnel expenditure. On average, this amounts to a decline of 1 per cent (see Table 16.5 Column [Change period 2–3]). Additionally, the numbers of military and reserve personnel also demonstrate decreases in this period; a decline of 4 per cent in military personnel (Appendix 1 Column [Change period 2–3]) and a much larger decline of 34 per cent in reserve personnel (Appendix 2 Column [Change period 2–3]).

In the subsequent period, some NATO countries increase, while others decrease their relative personnel spending. On average relative personnel expenditure increases by 3 per cent. The majority of NATO members (18) increase, while eight members decrease their relative spending (see Table 16.5 Column [Change period 3–4]). This pattern is different when we compare the absolute number of military and reserve personnel. Only Canada, Estonia, Norway, Slovenia and the US increase

their military personnel (Appendix 1 Column [Change period 3–4]). All other members reduce their military personnel. This trend is more evident for reserve personnel (Appendix 2 Column [Change period 3–4]).

In the next period 2015–2019 most NATO members decrease their relative spending on personnel. The average decrease within NATO amounts to 5 per cent (see Table 16.5 Column [Change period 4–5]). When examining the change in the overall number of military personnel and reserve personnel, the trend is similar to the relative spending behaviour on personnel. However, delving deeper into these numbers reveals that the scaling behaviour is quite different between member states. Especially states in the North Eastern part of Europe increase their numbers of military personnel: Estonia, Latvia, Lithuania and Poland (Appendix 1 Column [Change period 4–5]). Regarding numbers of reserve personnel, we see growth in Western European member states: Belgium, France and the Netherlands (Appendix 2 [Change period 4–5]).

All NATO-countries decrease their relative percentage spend on personnel expenses in the period after Russia's invasion of Crimea and the year 2022, in which Russia invaded Ukraine. The average decline across all NATO countries amounts to 10 per cent (see Table 16.5 Column [Change period 5–6]). Contrary to this pattern, we see in the last period for the entire NATO alliance that the decline in numbers of military and reserve personnel comes to a halt (Appendix 1 Column [Change period 5–6]).

Finally, the decisions made by member states regarding the use of conscription may also offer valuable insight into their scaling behaviour. The columns of period 1 (1980–1989) and period 2 (1990–1999) in Appendix 3 show that almost all member states have compulsory military service during and shortly after The Cold War. Canada, Luxembourg, the UK and the US are exceptions to this rule. Belgium (1994) and the Netherlands (1996) were among the first to abandon (suspend) compulsory military service and reform in all voluntary forces. In period 3 (2000–2009) we see that more member states follow this example. Scandinavian member states, Norway, Denmark and Finland, as well as the Baltic member states in the North East of Europe (Estonia, Latvia and Lithuania) all have compulsory military service during the entire period. The reinstatement of conscripts in Latvia in 2023 exemplifies the worsened safety situation after the Russian invasion of Ukraine in 2022. This re-introduction of conscription, or a larger reserve force, allows NATO member states to expand their size without incurring the continuous cost of maintaining a fully active, permanent force. This approach also enables the NATO alliance to quickly scale up its military presence if a major conflict emerges.

Table 16.5: Percentage of total defence expenditure on personnel

	1980-1989	1990-1999	2000-2009	2010-2014	2015-2019	2020-2024	Mean	SD	Min	Max					
Albania			66	73	7	70	-4	53	-17	65	23	37	78		
Belgium	63	68	5	72	4	77	5	74	-3	54	-20	68	15	50	79
Bulgaria			50	67	17	60	-7	58	-2	59	22	29	74		
Canada	49	47	-2	45	-2	49	4	53	4	48	-5	48	7	42	57
Croatia			72	70	-2	74	4	61	-13	69	15	55	77		
Czechia	47	47	0	58	12	56	-2	42	-14	50	15	29	62		
Denmark	56	59	3	53	-5	51	-2	49	-2	38	-11	53	14	26	60
Estonia			30	35	5	36	1	28	-8	32	10	22	40		
Finland								22		22	4	21	24		
France	58	57	-1	49	-9	47	-2	42	-5	52	13	39	60		
Germany	48	59	11	57	-2	51	-6	48	-3	38	-10	52	15	30	63
Greece	57	63	5	69	6	73	4	76	2	58	-17	65	16	46	80
Hungary			49	51	2	43	-8	29	-13	44	18	24	56		
Italy	59	68	10	73	5	76	2	71	-5	63	-8	68	13	59	78
Latvia			48	54	6	40	-14	35	-5	44	18	32	59		
Lithuania			57	65	8	42	-22	37	-6	50	24	32	67		
Luxembourg	77	77	0	70	-7	51	-20	37	-13	27	-10	63	38	21	83

	1980-1989	1990-1999	2000-2009	2010-2014	2015-2019	2020-2024	Mean	SD	Min	Max					
Montenegro	54	55	0	50	5	56	6	52	-4	44	-8	52	9	38	59
Netherlands	46	41	-6	42	1	42	0	37	-5	34	-4	41	8	32	49
N-Macedonia	62	62	61	56	-5	46	-10	38	-8	53	19	30	63		
Norway	67	79	12	78	-1	79	2	78	-2	64	-14	74	13	59	83
Poland															
Portugal															
Romania															
Slovak Republic															
Slovenia															
Spain															
Sweden															
Türkiye															
UK															
US															
Average NATO	54	57	4	56	-1	59	3	55	-5	44	-10	52	15	36	63

Source: NATO (2024). Note: Personnel expenditures include pensions paid to retirees, except for Bulgaria.

Synthesis and conclusion

Our analysis demonstrates that changes in NATO defence spending are not always driven by the presence of international threats. It appears that the Global Financial Crisis has had a greater impact on defence spending than the War on Terror. Literature also reveals little evidence to suggest a direct correlation between military threats and defence spending, both in the short and long term.²⁶ One plausible explanation for this is that defence policy adjustments regularly occur within the existing defence budget. NATO engagement at the outset of the War on Terror serves as a pertinent example. NATO countries adjusted their strategies in response to the changing threat landscape, investing in new equipment while simultaneously implementing budgetary cuts. However, an analysis of the post-Cold War period and the period following Russia's invasion of Ukraine does suggest a clear relationship between international threats and defence spending. When NATO needs to expand and adapt for a large-scale conflict, there is a correlation between both variables. During the post-Cold War period and after Russia's invasion of Ukraine in 2022, the up-and-down scaling behaviour of NATO member states (in its broadest sense) is clearly reflected in the defence expenditure figures.

The analysis also shows that NATO member states seem to prioritise scaling up their armed forces through material equipment expenditures rather than personnel expenditures as contemporary conflicts are increasingly driven by advanced military technologies. Investing in high-tech equipment provides a greater strategic advantage than merely increasing troop numbers. The state of NATO members' military equipment was also insufficient after decades of budget cuts and downsizing following the end of the Cold War. Modernisation programs were often postponed or scaled back due to budget constraints. The urgency of current threats has accelerated modernisation programs and the procurement of new equipment and ammunition. As a result, the relative equipment expenditures exceed the relative personnel expenditures. Therefore, the relative expenditures on personnel do not reflect the actual scaling behaviour of NATO. The fluctuations of military and reserve personnel and the choice to abandon (suspend), continue or even reinstate conscription provide more insight into changes in the personnel composition.

The assessment of individual behaviours of NATO member states suggests that states do not exhibit the same behaviour in their defence spending due to differences in strategic priorities, economic situation, political perspectives and geographical considerations. This results in NATO member states not necessarily scaling up or down simultaneously. The extent to which NATO countries scale up and down also varies. Threat perception and proximity to conflict are central in prioritising defence spending. For example, Eastern European states experienced

a more rapid increase in defence spending in the aftermath of the annexation of Crimea.

The size of the defence industry also appears to play a significant role. Despite the shifting security landscape, some NATO members maintained relatively stable equipment spending over the course of the period 1980–2024. Most of these countries have large defence industries. To ensure the continued existence of their industries, governments need to allocate substantial funds to ensure continued demand for military equipment.²⁷ As these states implemented only modest reductions in equipment budgets, they may be better equipped to handle unforeseen threats. Consequently, disproportionate investments in equipment are not required. A well-established defence industry, such as within the US, can also help to adapt more swiftly to changing security circumstances by leveraging the industrial base to speed up production and innovations. NATO member states with less extensive defence industries may experience more difficulties to accelerate procurement of military equipment. Given the early stages of NATO forces' scaling up after Russia's invasion, these differences have not yet been reflected in the figures.

Based on these findings we conclude that an urgency for scaling up military capabilities during the period 1980–2024 emerged only after Russia's invasion of Ukraine. This involves scaling up in a broad sense, with significant investments in equipment to expand and adapt NATO's capabilities to this renewed threat. In the years between the end of the Cold War and Russia's invasion of Ukraine in 2022, NATO had to adapt to new threats requiring the alliance to have a flexible force structure capable of operating across a wide spectrum of conflicts. To ensure that NATO remains effective going forward in a world of unpredictable security challenges, member states must invest in both conventional military capabilities and specialised tools for addressing irregular threats. These are very different requirements, each with its own cost structure.

Managerial implications

Research on scalability emphasises the importance of designing scalability as a core feature, not just a response to emergencies.²⁸ However, it is not always possible to predict future conflicts and the armed forces sometimes need to adapt rapidly to the new security environment as it emerges. Therefore, it is important to make a clear distinction between scaling up in a narrow and broad sense. The first takes place within and is the responsibility of the armed forces. It is focused on immediate or short term operational needs and requires limited public and societal involvement. The second requires a whole of society approach emphasising the active involvement of the population, government and private sector (e.g., defence

industry). A whole of society approach requires complex coordination between the armed forces, the private sector and society at large. This can be difficult as the primary goal of the private sector is to generate profit for its shareholders, while the armed forces provides public goods and services. These differing priorities may create tension. To address this challenge, the military needs to implement strategies that create both the capacity and incentive for defence industries to scale their operations when necessary.

As the figures in this chapter show, upscaling and downscaling the armed forces influences defence expenditures. Understanding the different cost structures for conventional forces and specialised forces is crucial for effective financial management. Conventional forces generally have higher personnel and equipment expenditures. Conventional forces also typically require larger fixed infrastructure (e.g., depots, airfields) increasing overhead costs. Specialised forces have a smaller but more highly trained workforce. These forces rely on advanced technologies that require ongoing innovation. The costs of specialised forces are significantly lower than those of conventional forces. Financial specialists must be proficient in the allocation of resources to maximise value, ensuring that both types of forces are adequately funded to fulfil their specific operational objectives.

Appendices

Appendix 1: Number of military personnel

Period	1	2	Change	3	Change	4	Change	5	Change	6	Change
	1980-1989	1990-1999	period 1-2	2000-2009	period 2-3	2010-2014	period 3-4	2015-2019	period 4-5	2020-2023	period 5-6
Albania				14,295		12,998	-9%	8,000	-38%	7,625	-5%
Belgium	91,782	57,250	-38%	39,081	-32%	33,254	-15%	28,410	-15%	23,888	-16%
Bulgaria				43,794		31,306	-29%	32,430	4%	36,950	14%
Canada	84,227	70,970	-16%	59,439	-16%	65,884	11%	65,200	-1%	65,675	1%
Croatia				18,600		17,780	-4%	15,630	-12%	16,350	5%
Czechia				33,950	-41%	23,432	-31%	22,360	-5%	26,175	17%
Denmark	30,693	29,041	-5%	23,816	-18%	17,637	-26%	15,780	-11%	15,400	-2%
Estonia				4,637		5,690	23%	6,410	13%	7,150	12%
Finland										23,850	
France	350,050			277,736	-21%	228,646	-18%	204,450	-11%	203,400	-1%
Germany	488,420	373,150	-24%	272,874	-27%	213,386	-22%	178,960	-16%	182,763	2%
Greece	196,650	163,164	-17%	162,977	0%	143,447	-12%	142,690	-1%	137,600	-4%
Hungary				31,677		26,343	-17%	27,280	4%	31,575	16%
Italy	381,100	317,580	-17%	218,756	-31%	180,518	-17%	172,010	-5%	162,250	-6%
Latvia				5,492		5,263	-4%	5,808	10%	7,050	21%

Period	1	2	Change		3	Change		4	Change		5	Change		6	Change	
	1980-1989	1990-1999	period 1-2	period 2-3	2000-2009	period 2-3	2010-2014	2010-2014	period 3-4	2015-2019	2015-2019	period 4-5	2020-2023	2020-2023	period 5-6	period 5-6
Lithuania					11,414		11,166		-2%	18,456		65%	23,325		26%	
Luxembourg	726	808	11%	11%	900	11%	900	0%	0%	900	0%	0%	533		-41%	
Montenegro										2,083			2,484		19%	
Netherlands	104,449	70,008	-33%	-29%	49,869	-29%	37,387	-25%	-25%	35,534	-5%	-5%	33,600		-5%	
N-Macedonia													8,000			
Norway	37,426	29,200	-22%	-18%	24,043	-18%	25,390	6%	6%	23,790	-6%	-6%	24,888		5%	
Poland		217,290		-33%	144,712	-33%	98,920	-32%	-32%	109,020	10%	10%	110,638		1%	
Portugal	68,934	53,715	-22%	-18%	43,991	-18%	41,155	-6%	-6%	29,480	-28%	-28%	26,813		-9%	
Romania					77,923		71,969	-8%	-8%	69,840	-3%	-3%	70,350		1%	
Slovak Republic					17,305		15,976	-8%	-8%	15,850	-1%	-1%	17,400		10%	
Slovenia					6,695		7,600	14%	14%	7,320	-4%	-4%	6,675		-9%	
Spain	279,750	203,840	-27%	-23%	156,348	-23%	137,774	-12%	-12%	121,420	-12%	-12%	123,500		2%	
Sweden																
Türkiye	618,138	579,680	-6%	-11%	513,600	-11%	510,600	-1%	-1%	386,280	-24%	-24%	355,200		-8%	
UK	322,173	243,519	-24%	-19%	197,248	-19%	169,290	-14%	-14%	150,820	-11%	-11%	149,113		-1%	
US	2,129,772	1,594,115	-25%	-7%	1,478,739	-7%	1,515,773	3%	3%	1,363,240	-10%	-10%	1,367,275		0%	
NATO Total	4,610,439	3,988,564	-13%	-4%	3,816,124	-4%	3,649,484	-4%	-4%	3,258,618	-11%	-11%	3,249,604		0%	

Source: The military balance (1981 – 2024)

Appendix 2: Number of reserve personnel

Period	1	2	Change	3	Change	4	Change	5	Change	6	Change
	1980-1989	1990-1999	period 1-2	2000-2009	period 2-3	2020-2014	period 3-4	2015-2019	period 4-5	2020-2023	period 5-6
Albania											
Belgium	275.845	185.645	-33%	27.396	-85%	3.600	-87%	5.750	60%	5.763	0%
Bulgaria		302.800				303.000	0%	63.000	-79%	3.000	-95%
Canada	22.545	39.250	74%	41.601	6%	32.153	-23%	30.690	-5%	34.000	11%
Croatia		21.000				12.600	-40%	7.340	-42%	20.338	177%
Czechia											
Denmark	105.170	74.440	-29%	73.341	-1%	53.503	-27%	46.920	-12%	44.200	-6%
Estonia		19.400				30.000	55%	15.600	-48%	23.425	50%
Finland										233.000	
France	352.000			94.990	-73%	30.864	-68%	32.580	6%	40.138	23%
Germany	786.500	511.195	-35%	283.165	-45%	41.286	-85%	28.930	-30%	31.875	10%
Greece	403.000	337.000	-16%	282.850	-16%	223.495	-21%	220.720	-1%	255.175	16%
Hungary		57.890				44.000	-24%	34.400	-22%	20.000	-42%
Italy	743.400	442.920	-40%	55.190	-88%	27.830	-50%	18.300	-34%	17.150	-6%
Latvia		11.120				9.006	-19%	9.990	11%	13.425	34%
Lithuania		6.700				6.700	0%	6.700	0%	7.100	6%

Period	1 1980-1989	2 1990-1999	Change period 1-2	3 2000-2009	Change period 2-3	4 2020-2014	Change period 3-4	5 2015-2019	Change period 4-5	6 2020-2023	Change period 5-6
Luxembourg	-	-	-	-	-	-	-	-	-	-	-
Montenegro										2.100	
Netherlands	170.200	104.640	-39%	28.658	-73%	3.196	-89%	4.240	33%	6.000	42%
N-Macedonia										4.850	
Norway	224.160	258.400	15%	178.960	-31%	45.526	-75%	42.024	-8%	40.000	-5%
Poland		406.000		226.600	-44%	-	-100%	-		8.113	
Portugal	163.556	206.369	26%	210.921	2%	211.741	0%	211.900	0%	117.600	-45%
Romania				56.800		45.000	-21%	50.600	12%	54.500	8%
Slovak Republic				8.000		-	-100%	-		-	
Slovenia				13.520		1.620	-88%	1.440	-11%	975	-32%
Spain	2.400.000	654.560	-73%	322.800	-51%	139.620	-57%	14.020	-90%	14.750	5%
Sweden											
Türkiye	878.000	654.250	-25%	378.700	-42%	378.700	0%	378.700	0%	378.700	0%
UK	292.237	314.452	8%	236.014	-25%	80.660	-66%	81.560	1%	74.163	-9%
US	1.688.247	1.751.800	4%	1.100.736	-37%	849.122	-23%	851.710	0%	828.138	-3%
NATO total	6.216.504	5.751.521	-7%	3.809.970	-34%	2.573.223	-32%	2.157.114	-16%	2.103.725	-2%

Source: The military balance (1981–2024)

Appendix 3: Conscription

Period	1	2	3	4	5	6
	1980-1989	1990-1999	2000-2009	2010-2014	2015-2019	2020-2023
Albania				C	NC	NC
Belgium	C	C (1994)	NC	NC	NC	NC
Bulgaria			C	NC	NC	NC
Canada	NC	NC	NC	NC	NC	NC
Croatia				NC	V	V
Czechia			C (2004)	NC	NC	NC
Denmark	C	C	C	C	C / V	C / V
Estonia			C	C	C	C
Finland						C
France		C	C (2001)	NC	NC	NC
Germany	C	C	C / V	V	V	V
Greece	C	C	C	C	C	C
Hungary			C (2008)	NC	NC	NC
Italy	C	C	C (2007)	NC	NC	NC
Latvia			NC	NC	NC	C
Lithuania			C	C	C	C

Period	1	2	3	4	5	6
	1980-1989	1990-1999	2000-2009	2010-2014	2015-2019	2020-2023
Luxembourg	V	NC	NC	NC	NC	NC
Montenegro					NC	NC
Netherlands	C	C (1996)	NC	NC	NC	NC
N-Macedonia						NC
Norway	C	C	C	C	C	C
Poland			C	NC	NC	NC
Portugal	C	C	C (2006)	NC	NC	NC
Romania			C (2006)	NC	NC	NC
Slovak Republic			C	C	C (2019)	NC
Slovenia			NC	NC	NC	NC
Spain	C	C	NC	NC	NC	NC
Sweden						
Türkiye	C	C	C	C	C	C
UK	NC	NC	NC	NC	NC	NC
US	NC	NC	NC	NC	NC	NC

Source: The military balance (1981-2024); Note: C = Conscription; NC=No conscription; V=Voluntary

Notes

- ¹ Helmonds et al., *European defense in a new age*.
- ² Jakub Odehnal and Jiří Neubauer. “Economic, security, and political determinants of military spending in NATO countries”, 517–531.
- ³ Justin George and Todd Sandler. “NATO defense demand, free riding, and the Russo-Ukrainian war in 2022”, 784.
- ⁴ François Heisbourg. “Planning for a post-American Europe”, 7–20.
- ⁵ Coviello et al., “Organizational scaling, scalability, and scale-up: Definitional harmonization and a research agenda”, 106419.
- ⁶ Renée Kidson, *Accelerated Preparedness-Scalability Insights for Defence*.
- ⁷ NATO. “NATO’s military presence in the east of the alliance”, 2024d.
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- ¹³ NATO. “Speech by Secretary General Jens Stoltenberg at the NATO-Industry Forum”, 2023a.
- ¹⁴ Knight et al., “The peace dividend: Military spending cuts and economic growth”, 1–37.
- ¹⁵ Jakub Odehnal and Jiří Neubauer. “Economic, security, and political determinants of military spending in NATO countries”.
- ¹⁶ Marion Bogers and Robert Beeres. “Mission Afghanistan: Who bears the heaviest burden”, 32–55.
- ¹⁷ Francesco Pontiroli Gobbi, “NATO in the aftermath of the financial crisis”.
- ¹⁸ Camille Grand, “Defense spending: Sustaining the effort in the long-term”.
- ¹⁹ GOV UK. “Operations in Afghanistan”.
- ²⁰ Council on Foreign Relations. “The U.S. War in Afghanistan”.
- ²¹ Malcolm Chalmers, “The end of defence austerity? The 2019 spending round and the UK defence budget”.
- ²² Marion Bogers and Robert Beeres. “NATO members’ burden sharing behaviour in the aftermath of Russia’s annexation of Crimea, 2014–2021”.
- ²³ Marc Pierini, “Turkey’s foreign policy ambitions meet reality”.
- ²⁴ Elitsa Petrova, “A review of the expenditures on defence of the Republic of Bulgaria for 2010–2015”, 488–496.
- ²⁵ NATO, “NATO Wales Summit Declaration”.
- ²⁶ Jordan M. Becker, “Accidental rivals? EU fiscal rules, NATO, and transatlantic burden-sharing”, 697–713; Benjamin O. Fordham, “Domestic politics, international pressure, and the allocation of American Cold War military spending”, 63–88; Anessa Kimball, “Political survival, policy distribution, and alliance formation”, 407–419; Cappella et al., “What goes up, must come down? The asymmetric effects of economic growth and international threat on military spending”, 791–805.
- ²⁷ Bogers et al., “Strengthening European defence industry autonomy?”.
- ²⁸ Coviello et al., “Organizational scaling, scalability, and scale-up”.

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Growing gains? Financial scalability of the Dutch defence industry by private equity

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Abstract

This chapter presents the results of our research into the potential for financial scalability of the defence industry caused by the increase in investments in this industry, specifically by Private Equity (PE) firms. It investigates the following questions: (1) to what extent does the Dutch defence industry use private equity as a source of business capital; and (2) what are the effects of the use of private equity in the growth of the companies involved? To this end, we analyse current financial statements of the defence industry in the Netherlands. Based on a comprehensive dataset we determine if and how much, PE firms invest in national defence corporations, as an indicator for scalability in the defence industry. Results show that the involvement of private equity in the Dutch defence industry is still rather small; however when PE is applied, companies seem to benefit from the financial injections of PE, showing higher amounts of average total assets and higher average revenues and profits. This indicates potential for financial scalability.

Keywords: Private equity; Defence industry; Investing; Scaling; Business capital

Introduction

Recent armed conflicts between states demand an increase in the production capabilities of national defence industries. Due to recent conflicts, Western countries have increased their spending on defence, varying from states close to the countries in conflict (e.g., Poland and the Baltic states), to countries further west (e.g., the United Kingdom, the Netherlands and the United States).¹ As a result, new corporations have entered the market and existing corporations in the industry are receiving more, and larger, orders than before.

Increasing order portfolios leads to growth in market value, which in turn results in a broader interest from external investors. This benefits the defence industry in each country, since the exploding demand for arms and military supplies requires large investments in production facilities. In general, these investments require lots of money, which need to be funded by the companies

themselves, the government of their home country, or external investors and is based on their willingness to invest more and more bucks for bombs.²

In this chapter, we focus on the role of Private Equity (PE) firms in funding the defence industry. PE has a predominant goal: to make money, preferably at short notice. As the defence industry at this time offers that opportunity, we expect PE firms to increase activities in this sector, through buying stocks or even acquiring complete corporations in the arms industry.

Against this background, the question arises if we can already see private equity capital being active and growing as a source of business capital in the defence industry. Until now, we have found little previous research in this domain.³ In the flow of the geopolitical developments, this research gap needs to be bridged. As a first exploration, we focus on the Dutch defence industry, both to limit the scope of work and for reasons of data availability. More specifically, we answer the following questions: (1) to what extent does the Dutch defence industry use private equity as a source of business capital; and (2) what are the effects of the use of private equity in the growth of the companies involved?

To this end, we selected a sample of 29 companies that currently (in 2024) are active in the defence industry. We collected the relevant financial data of this sample from the financial statements over a five-year period (reporting years 2019–2023) and investigated the financial statements to determine the involvement of private equity. We find four defence companies with involvement of PE. These four companies significantly grow faster in the fore-mentioned five-year period (in terms of indices showing development of average equity, total assets, revenues and profit) than the 25 defence companies without involvement of PE in the same time period.

The remainder of this chapter is structured as follows. The subsequent section provides a theoretical perspective on ways to re-scale finance in the defence industry. The third section outlines the data sources. The fourth section presents our results. The final sections provide a conclusion and managerial implications.

Rescaling finance in the defence industry

How the defence industry is organised – either via state owned enterprises or privately owned corporations – is a matter of a country's government policy and varies on a continuum. On one end of the continuum, there are countries that are more likely to control corporations in the defence industry (e.g., North Korea and China). On the other end of the continuum, there are countries that are less likely to control corporations in the defence industry (e.g., the Netherlands and Belgium). Between both ends of the continuum, there is a large spectrum of countries

balancing control between private and public corporations.⁴ An example would be France, that traditionally operates with the use of private corporations. However, its government retains some control over these companies as a shareholder.⁵ The way that companies are organised goes along with capital-related issues such as ownership and finance.⁶

The defence industry is considered a very capital-intensive industry that faces major costs from investments in tangible assets (e.g., machinery, equipment and other costly facilities) and in intangible assets (e.g., research and development (R&D), human resources and intellectual property rights). Scaling up a capital-intensive business requires investing large sums of money upfront on assets that have considerable lead times, measured in years rather than in months. Given the present geopolitical situation, there is enormous pressure on all companies in the defence industry to scale up their production.⁷

Over the last decade, global military expenditure has reached all-time highs and the end of this trend is not expected soon.⁸ In the Western world, the members of the North Atlantic Treaty Organisation (NATO) have committed themselves to spending two per cent of their national Gross Domestic Product (GDP) on defence spending to ensure the Alliance's continued military readiness.⁹ Together with today's reality of international conflicts between states, the result of this is that the order books in defence industries are full for years to come. However, cost comes before benefit and cash inflows are only realised after large cash outflows are made. In essence, this means companies need to rescale their production. However, before they can rescale their production, they need to rescale their finance.

Rescaling finance comprises several activities. Companies may need to (1) enlarge their fixed assets (both tangible and intangible assets), probably the largest finance need, and (2) enlarge their liquid assets, also involving large sums considering the amount of pre-financing needed for the work in progress that comes with the loaded order books, and finally (3) they may even need to replace outdated assets as they are not fit for use in the near future.

In general, sources for business capital (i.e., finding the money needed for rescaling their finance) to be considered are:¹⁰

- (1) Equity capital: share issues can be done to enlarge equity, either to the general public or to specific (groups of) companies called PE. In general, PE is stock in a private company that does not offer stock to the general public. A specific form of PE is Venture Capital. Venture Capital is a type of financing for start-up companies and small businesses with long-term growth potential. Common practice is that PE firms or providers acquire a share in an enterprise that they expect to be worth more in the future. In general, share issues of different forms result in strengthening the company's risk-bearing capacity;

- (2) Debt capital: extra debt capital can be found by arranging bank loans issuing bonds or arranging commercial credits. A lot of this capital is interest bearing;
- (3) Retained earnings: profits realised can be retaining instead of paying them out to shareholders, thus creating extra equity;
- (4) Grants and subsidies: these can be provided by governments, Non-Profit-Organisations (NPOs) and private organisations;
- (5) Trade creditors and suppliers: companies can rearrange their payment conditions with trade creditors and suppliers, by which they can effectively enlarge their working capital, and finally companies could turn to;
- (6) Crowdfunding: crowdfunding platforms facilitate companies to collect capital with a large number of small individual investors.

The defence industry faces major financial rescaling and therefore companies will turn to sources that bring in cash money fast in large amounts. This makes the options under (3), (5) and (6) less likely, and leaves options (1), (2) and (4) more prominent as a source of financing growth.

Let us explore these remaining options. Collecting equity from the general public was and still is difficult for the defence industry, as potential shareholders might be opposed to investments in defence companies based on ethical arguments. These investments go against the environmental, social and governance (ESG) concept, which holds that any company making weapons is bad and should not be invested in. This is why defence stock was not that popular not long ago. And although public opinion on the topic is changing gradually, the general public, banks, governments and NPOs are still hesitant to step in.¹¹ This may explain why the defence industry might turn to PE for business capital. It might also explain why politics and government are engaged in this pressing topic.

In the draft for the Act on the Resilience of the Defence and Security related Industry, the Dutch government states that the Netherlands defence and safety related technological and industrial base has structural problems attracting sufficient business capital.¹² The most important reasons the defence industry struggles to obtain business capital are:

- (1) Uncertain return on investment;
- (2) Uncertain payback periods, that diverge from other business;
- (3) The reputational risk for the funders of business capital to the defence industry, and;
- (4) The fact that the defence market is a niche market with limited volumes to cover returns and a concentration of risk with only a few market players. As such, the defence market can be typified as a monopolistic or near-monopolistic market.¹³

Because of this, the defence industry only has limited resources to develop projects and concepts that easily connect with the newest needs of defence organisations and limited potential to scale up its production capacity. Therefore, the draft of the Act on the Resilience of the Defence and Security related Industry suggests that venture capital is needed for the defence industry in the Netherlands and that with an investment test the lawmaker can get a grip on capital influx in the defence industry, preventing control over these companies falling into the wrong hands (e.g., parties not preferred by the governments). So, although there is an absolute need for private equity there is also a control risk at stake.

Methodology

What does the area for potential research data look like? In a recent memo on Dutch Defence Strategy, the Dutch defence industry was said to consist of some 350 large and small companies with a joint turnover of €4.5 billion. The sector employs 25,000 people, of whom almost 8,000 are in research and development. The sector is responsible for approximately 0.7% of GDP.¹⁴ To build a relevant dataset we selected a sample of 29 companies that currently are very active in the industry (Attachment A). Six companies in our sample are mainly active in the marine defence sector, sixteen companies mainly produce for the land-based defence sector and seven companies mainly for aerospace. This is of course slightly contrived since most companies serve two or even three sectors with their products and services. We then downloaded the financial data of these companies from the financial statements as filed with the Chamber of Commerce in the Netherlands over a five-year period (2019–2023). The financial data we collected are revenues, profit, total assets and equity. We also checked the financial statements to see if we can determine the involvement of private equity.

There are a few limitations to the collection of financial data. Therefore, we were not able to get the financial data for every company for each year in the five-year period. Companies sometimes are legally exempt from depositing financial statements with the Chamber of Commerce in the Netherlands, due to (1) a legal exemption from depositing financial statements being part of a larger stock traded company or (2) a legal exemption from depositing financial statements being a small or micro legal entity as defined in Dutch Civil Code or (3) a legal exemption from depositing financial statements based on the type of company (i.e. association and non-profit foundations).

The next section presents our findings.

Results

Before we focus on private equity as a source of business capital, first we describe relevant legal and financial characteristics of the companies in our sample. The legal form of all of the companies in our sample is that of a private limited company. None of the companies are public limited companies. Eight out of the twenty-nine companies are part of a larger entity or group or are owned by a holding, which is a listed company. A listed company is a public company. It has issued shares of its stock through an exchange, with each share representing a sliver of ownership of the company. A listed company must apply to an exchange to be listed, which can make it easier to reach out to new capital. In our sample, only a minority of the companies have this easy access to capital markets, especially when it comes to issuing new shares to collect new equity. This might put pressure on the majority of companies in our sample to find other ways to enlarge their equity especially under the current circumstances.

The average financial characteristics of defence companies in our research sample are summarised in Table 17.1.

Table 17.1: Financial characteristics of defence companies (€ per company per year, period 2019–2023)

	N	Revenues	Profit	Total Assets	Equity
No PE involved	25	€ 190,291,694	€ 8,378,473	€ 91,714,814	€ 24,133,922
PE involved	4	€ 65,913,512	€ 9,324,153	€ 32,073,779	€ 12,907,847
Total sample	29	€ 160,677,841	€ 8,603,635	€ 81,965,799	€ 22,298,890

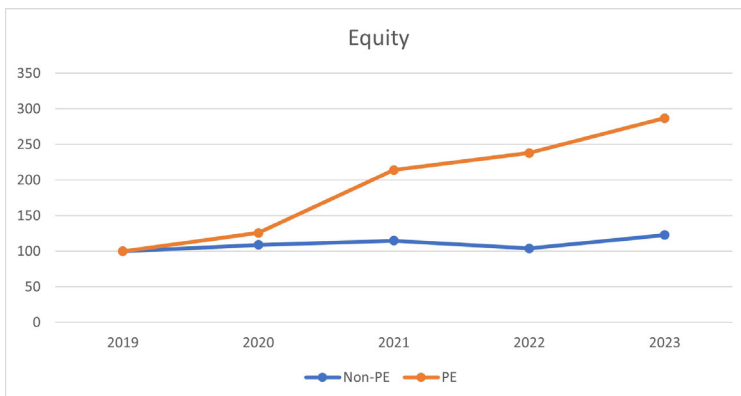
From Table 17.1 it appears that the average company in our sample has a revenue of around €161 million, makes about €9 million profit on a total asset base of €82 million and equity of around €22 million. In four out of twenty-nine defence companies, we find involvement of PE. So PE is present, however not widespread in the Dutch defence industry yet. The four companies in which we see private equity are Defenture, Fokker Services Group, Mr Marine Group, and Seko Benelux. The private equity investors in the companies are respectively: Azure investment group (founded 2014, head-office in the Netherlands), Panta Holding (founded in 1984, head-office in the Netherlands), Committed Capital (founded in 2008, head-office in the Netherlands) and Ridgemont Equity Partners (founded in 1993, head-office in the United States). The involvement of PE is not observed in 2019. In 2020, we find PE involvement in one company (Mr Marine Group). In the period 2021–2023,

the latest three reporting years in our data set, we find PE involvement in four companies. PE is an emerging phenomenon in the defence sector.

When comparing the groups with and without involvement of PE we find differences. Companies with PE have revenues of around €66 million, those without PE lie around €190 million. When comparing profit we see both groups of companies are almost equally profitable (with PE at an average of €9.3 million and without €8.4 million). The total assets of both groups average from €92 million for companies without PE to €32 million for companies with PE. We see the same difference for equity, where companies without PE have an average of €24 million and companies with PE an average of €13 million. Companies with PE have lower average revenues, assets and equity but are slightly more profitable. This might be the reason they attracted PE.

Now we take a closer look at developments in the five-year period of our dataset. Figure 17.1 depicts the development of average equity over the years studied. As expected average equity rises far more sharply for companies with PE, where it almost triples over a five-year period. The rise starts in 2020, which is the year of the first company with PE in our dataset. In the final year, 2023, the index for companies without PE is 123 and it is 287 for companies with PE. We find that involvement of PE is definitely a strong impulse for the development of equity in companies, and indirectly for their growth.

Figure 17.1: Index of average equity per year, period 2019–2023 (base-year 2019 = 100)



Next, Figure 17.2 presents the development of average total assets over the years studied. Looking at the development of average total assets over a five-year period, we see an even steeper rise than in Figure 17.1 for companies with PE, reaching 655 in 2023 as compared to 175 for companies without PE. We find that PE (in) directly paves the way for enlargement of the total assets of the companies and

thereby also its growth, thus being a lever for financial scalability. It seems the PE injections might at least partly provide the necessary means for companies in a market with growing demands.

Figure 17.2: Index of average total assets per year, period 2019–2023 (base-year 2019 = 100)

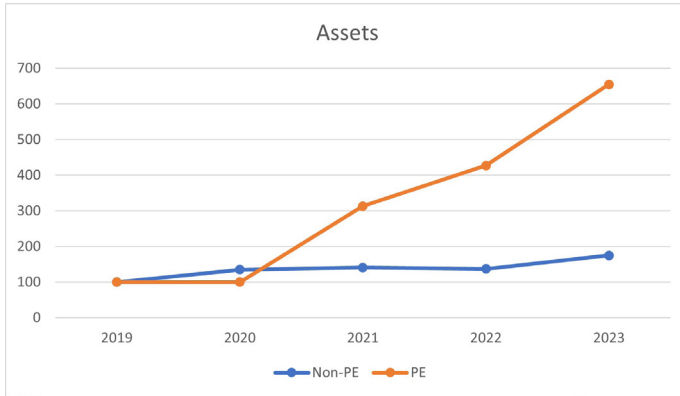
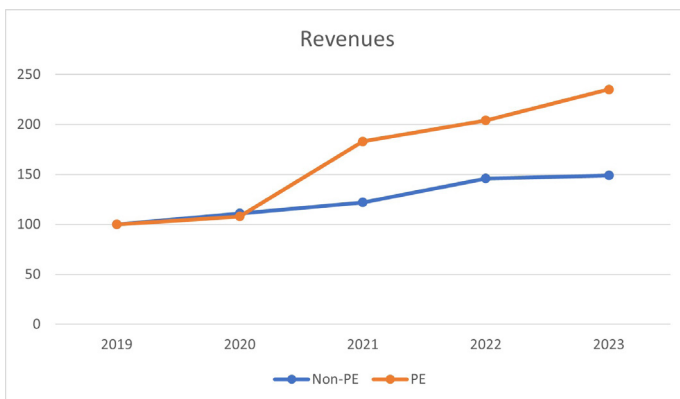


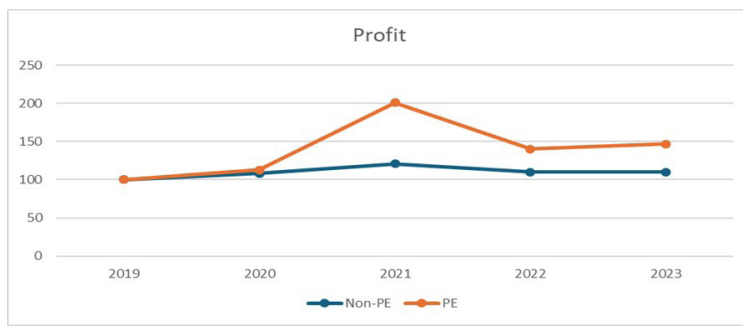
Figure 17.3 presents the development of average revenues during 2019–2023. The development of average revenues over the period studied has a slower growth pace as compared to the average equity (Figure 17.1) and the asset base (Figure 17.2). The index rise increases to 235 in the year 2023 for companies with PE, compared to 149 for companies without PE. However, the growth of average revenues is still significant larger when PE comes into play, from the year 2020 and thereafter. PE also appears to be a stimulus for growth in revenues.

Figure 17.3: Index of average revenues per year, period 2019–2023 (base-year 2019 = 100)



Finally, the development of average profits over the five-year period is presented in Figure 17.4. Average profit shows the most modest developments over a five-year period. In companies with PE, the index rises to 147 in the year 2023 and for companies without PE it rises to 110 in 2023. However, the growth of average profit still shows a steeper slope when PE comes into play, and given the difference between the indices of 37 in the final year, 2023 growth is significantly larger. Moreover, based on the fact we only studied a five-year period, growth, this picture will develop, as investments still need time to produce tangible results.

Figure 17.4: Index of average profit per year, period 2019–2023 (base-year 2019 = 100)



In summary, the four defence companies with involvement of PE seem to grow much faster (in terms of equity, total assets, revenues and profit) than the 25 defence companies without involvement of PE in the same time period. Average total assets show growth rates largely extending 100 per cent from one year to the next, sometimes even doubling and tripling in subsequent years. Average revenues and equity also show steep growth rates, as does profit, be it slightly more modest. In general, this sharply differs from defence companies that do not employ PE, where growth rates are much more moderate.

Conclusions

We conclude that the growth of the defence market and industry have drawn the attention of PE. The answer to our first research question is that the involvement of private equity in the Dutch defence industry is still rather small, as only four companies in our sample show involvement and investment of PE. But (second research question) these four companies seem to benefit from the financial injections done by PE, as we discussed above, showing higher amounts of average total assets and higher average revenues and profits.

Still, PE is in an early stage of development. Providers of these sources of finance need to be persuaded that the defence industry is a longer-term profitable investment. Considering the volume of investments typically needed for a single case, lead-time is considerable. However, when the defence market shows evidence of profitable investments, more PE will inevitably be attracted.

Our results show that when more PE flows into the defence industry, we can expect direct growth of companies involved: growth in financial results, but also in terms of assets. Therefore it might just fulfil exactly the current needs of the defence industry, and help scale up its performance in the short term, when other sources of finance fall short. However, more research is necessary to follow the development of the involvement of PE in the Dutch defence industry in the near future and also to assess the impact of PE in this industry.

Managerial implications

We end the chapter with a short reflection on the desirability of involving PE in the defence industry. Arguments in favour of using PE are the following. First, this source of business capital is useful for relatively smaller companies as this enables them to grow faster. Second, PE provides access to capital that might otherwise be unavailable and can help companies grow and achieve their goals. A third advantage is that PE can help improve valuation. This is because PE firms typically invest in businesses with high growth potential. As a result, companies will be worth more when they are sold. Finally, a fourth advantage is that PE firms can provide valuable resources and advice. They typically have a lot of experience growing businesses. They can help companies navigate through the challenges of scaling quickly and efficiently.

However, there are also a number of disadvantages that companies should be aware of before trying to attract PE. First, PE firms charge high fees. These fees can negatively affect income and returns, and make it difficult for other investors and shareholders to realise a profit on their investments. A second disadvantage of PE is the potential for conflicts of interest. Because PE firms often invest in and control the companies they own, there is a potential for them to make decisions that are not in the best interests of the company or its shareholders. Third, the focus of PE can be too much focused on short-term financial results and thus be detrimental to defence organisations and their budget. Despite these disadvantages, to us PE is considered to be a valuable tool for companies who are willing to accept the risks. If scaling up the defence industrial capacities is necessary to satisfy growing demands, it can help if the Dutch government actively assists in attracting PE, while keeping an eye on the risks regarding the production of strategic goods.

Our findings indicate that because of the increase in scalability of the national defence industry, the demand for more strategic goods and military equipment of the Dutch armed forces may be met. PE investing in national producers of strategic goods, offers an additional opportunity for our armed forces to be provided with the necessary means to the desired end, with quick and swift upscaling of its military power.

Annex A

Sample of Dutch defence industry

NR COMPANY

- 1 AAR Aircraft Components Services
- 2 ADSE Consulting & Engineering
- 3 Airbus Defence & Space Netherlands B.V.
- 4 Aviolanda Aerospace
- 5 Daedalus Aviation Group
- 6 Damen Schelde Naval Shipbuilding B.V.
- 7 Defenture B.V.
- 8 Delft Dynamics B.V.
- 9 DTEC Naval Industries B.V.
- 10 Dutch Military Vehicles B.V.
- 11 Fokker Services Group
- 12 Fox-IT
- 13 Hamilton Sundstrand Customer Support Center Maastricht
- 14 Mr Marine Group B.V.
- 15 Nevesbu B.V.
- 16 NLR –Netherlands Aerospace Centre
- 17 Palantir Technologies NL
- 18 Patria
- 19 RH Marine Netherlands B.V.
- 20 Rheinmetall Defence Nederland
- 21 Robin Radar Systems B.V.
- 22 RSM Nederlandse Business Consulting Services B.V.
- 23 SEKO Government Services & Defence
- 24 Solico Engineering B.V.
- 25 Thales Nederland B.V.
- 26 TNO Defensie en Veiligheid
- 27 Van Halteren Naval Technologies B.V.
- 28 VDL Defence Technologies
- 29 Verebus Engineering B.V.

Notes

- ¹ Marion Bogers and Robert Beeres. “NATO members’ burden sharing behaviour in the aftermath of Russia’s annexation of Crimea, 2014–2021”; Robert Beeres and Marion Bogers “Slagkracht pas groter als er langjarig in Defensie wordt geïnvesteerd”, 55–57.
- ² Jean Belin and Mahdi Fawaz. “Profitability of defense companies in the US and Europe”, 418–419.
- ³ Lorenzo Scarazzato and Madison Lipson. “Going private (equity): A new challenge to transparency in the arms industry”, 1–12.
- ⁴ Keith Hartley and Jean Belin, eds. *The economics of the global defence industry*.
- ⁵ Sylvain Moura and Jean-Michel Oudot, “Performances of the defense industrial base in France: The role of small and medium enterprises”, 652–668.
- ⁶ Brealey et al., *Fundamentals of corporate finance*, 860–879.
- ⁷ Juan Mejino Lopez and Guntram B. Wolff, A European defence industrial strategy in a hostile world.
- ⁸ Tian et al., “Developments in military expenditure and the effects of the war in Ukraine”, 547–562.
- ⁹ NATO. “Wales Summit Declaration.” 2014.
- ¹⁰ Brealey et al., *Fundamentals of corporate finance*.
- ¹¹ Jan Bletz, “Defensie: aarzelende investeerders ondanks vele groeimogelijkheden.” 17th July 2024, Mergers and Acquisitions, <https://mena.nl/artikel/defensie-industrie-nederland-aarzelende-investeerders-ondanks-vele-groeimogelijkheden/>
- ¹² Overheid.nl. *Act on the Resilience of the Defence and Security related Industry (Wet weerbaarheid defensie en veiligheid gerelateerde industrie) 2024*.
- ¹³ Bertrand et al., “Understanding contract audits: An experimental approach”, 1–31.
- ¹⁴ Netherlands Ministry of Defence and the Netherlands Ministry of Economic Affairs and Climate Policy. MEMO Defence Industry Strategy, 2018.

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Export controls: A scalable set of instruments to counter threats to national and global security in a changing world

Joop Voetelink

Abstract

Export controls aim to regulate international trade in strategic items with specific end-users and states of concern. These controls include tools such as economic and other sanctions, as well as general export restrictions and foreign direct investment screening. An analysis of contemporary developments and practice – focusing on actions taken in response to the rising tension between the United States and China, as well as the conflict between Ukraine and Russia – highlights that these tools provide states and international organisations with a scalable system to counter threats to national and global security and to help restore stability in international relations.

Keywords: Export control; Economic sanctions; Restrictive measures; Export restrictions; Investment screening; Foreign direct investments; National security; Economic security

Introduction

Export controls seek to regulate the export of military, dual-use,¹ and other goods, technology, and software (together referred to as strategic items) to certain end-users or states of concern, particularly in times of heightened tensions and international armed conflicts. Tools to implement national export control policy include coercive measures such as economic, financial and diplomatic sanctions and general export restrictions. Such measures can be imposed as part of a more comprehensive diplomatic and, ultimately, military approach, both in peacetime and armed conflict, helping to prevent further escalation or denying an adversary access to certain strategic and other items.

Export controls provide states and international organisations, such as the European Union (EU), with a scalable set of instruments to achieve (foreign) policy objectives. Scalability, in this context, refers to the ability of states and international organisations to adjust the various interconnected export control measures incrementally, either tightening or relaxing the export of strategic items. These

adjustments can be applied broadly or targeted to specific items, countries and regions, depending on the perceived level of threat to national or international security or other public interest concerns.

In the recent past, multilateral export control regimes, such as the Wassenaar Arrangement and the Missile Technology Control Regime, as well as economic sanctions imposed by the United Nations Security Council, ensured a relatively uniform application of export controls by supplier states of strategic items, reducing the need for scalable use of the export control instruments. However, the Russian Federation's (hereinafter referred to as Russia) position in the multilateral export control regimes and the UN Security Council following Russia's further invasion of Ukraine in 2022 has diminished the effectiveness of these international forums. Consequently, other states and the EU have begun to take a more scalable approach to address threats to national and international peace and security.

However, these controls are insufficient in themselves to address certain concerns about (economic) security, particularly those arising from Chinese ambitions. This recent development has led to increased use of another export control instrument, the screening of foreign direct investments. Deploying all these tools requires well-coordinated international cooperation, as shown by the international response to the conflict between Ukraine and Russia. The Group of 7 (G7) members,² like-minded states, and the EU have acted upon the Russian aggression and threats with a broad and evolving array of closely coordinated economic sanctions and other export control measures.

This chapter reflects on the use of export control measures as a scalable system to address national and global security threats by analysing contemporary international practice. After providing a brief overview of export controls in general and introducing the principal export control instruments currently available to states and international organisations, the chapter analyses the evolution of these measures over time. Next, current practice is examined, focusing on actions taken following the escalating tensions between the United States and China, as well as the conflict between Ukraine and Russia. Finally, the chapter reflects on the implications of the scalable use of export control instruments before presenting a synthesis and conclusion.

The chapter maps the current field of export control instruments within a multipolar, divided world order rather than addressing the complex question of the measures' effectiveness.³ Also, as a foreign policy tool, export controls are implemented as part of a broader approach to address national and international security threats. However, this chapter will not discuss the interactions that necessarily exist between export controls and other economic, diplomatic, and military instruments to address the threats.

Export control tools

Throughout human history, people have engaged in both warfare and arms trade, while simultaneously seeking to restrict or even prohibit the transfer of certain weapons and related military equipment. These trade restrictions and prohibitions, or: export controls, aim to deny adversaries the use of the weapons or prevent the proliferation of goods and technologies. From a legal perspective, export controls can be described as a combination of national and international laws and regulations, as well as policy guidelines and international commitments that govern the export from, the transit through, and the transfer within a country, as well as brokering of strategic and other items. This comprehensive description encompasses instruments such as economic and other sanctions, export control restrictions and foreign direct investment screenings.

Sanctions

Sanctions, or ‘restrictive measures’ as termed by the EU, are “measures not involving the use of armed force, which a state or international governmental organisation can impose on a state, entity, or individual to exert pressure and induce a change in policy or behaviour.”⁴ Today’s most common forms of sanctions are arms embargoes, financial measures, and travel bans.⁵ These are key instruments in the United Nations (UN) collective security system, allowing the UN Security Council to impose sanctions where it determines a threat to international peace and security exists.⁶ States and international organisations implement UN sanctions by adopting their own legislation. Increasingly, they supplement the UN sanctions or impose them independently in situations where no UN sanctions apply. These autonomous or unilateral sanctions have become a common feature in contemporary international relations, although their legal basis is sometimes questioned. However, autonomous sanctions are now generally accepted as a lawful countermeasure when the sanctioned states have breached their international obligations under treaties, other international agreements, international customary law, or binding decisions of international organisations.⁷

Export restrictions

Until the Second World War, export restrictions related to military goods were traditionally associated with armed conflict. However, after the war and with the onset of the Cold War, states continued to apply these controls, broadening them to include dual-use goods and, ultimately, military and dual-use technology and software. While Cold War export controls were primarily focused on the Soviet

Union and its allies, today, export controls mainly aim to prevent the proliferation of arms and other military items, dual-use items, and weapons of mass destruction to non-state actors and states of concern. To that end, states coordinate their obligations under various arms control treaties and conventions⁸ through multilateral export control regimes, such as the Wassenaar Arrangement (conventional arms and dual-use items), the Nuclear Suppliers Group and the Zangger Committee (nuclear material and technology), the Australia Group (chemical and biological weapons), and the Missile Technology Control Regime.⁹

The guidelines and control lists adopted by the regimes are incorporated into national and EU export control legislation. Generally, items controlled under these laws and regulations may only be exported if specific requirements are met, or an explicit authorisation has been granted, for example, through an export license. As a kind of safeguard, export control legislation often includes provisions whereby items not listed on the control lists may still be subject to export restrictions if a risk identified in the applicable rules applies to the item in question when sent to certain end-users (known as ‘catch-all’ provisions).

Investments controls

While sanctions and export restrictions have a long-standing history, traditionally associated with armed conflict, the regulation of investment controls, in particular the screening of outbound investments, has emerged as a growing area of legal scrutiny that is not explicitly tied to regional or global high-tension situations. Foreign direct investments are defined as “cross-border investment in which an investor resident in one economy establishes a lasting interest in and a significant degree of influence over an enterprise resident in another economy.”¹⁰ Investments made by companies incorporated in other states in domestic businesses (inbound investments) and national investments in foreign companies (outbound investments) alike can pose security risks as they may involve the transfer of technology to the foreign entity or state. Consequently, a growing number of countries and organisations are now developing procedures and regulations for investments.

The development of export control tools

Recent global events underscore the crucial role of export controls as a scalable part of a state’s foreign policy toolbox to address the dynamics of economic and other threats to national and international security. It is important to note that each of the export control tools, in particular export restrictions and investment screening, can serve as an initial step in addressing a potential threat to national security. These

tools, possibly used in coordination with one another, allow for a scalable approach to such threats. Where necessary, implementation and enforcement of the tools can be tightened, for example, by denying an export license to a specific country or rejecting a particular investment. Furthermore, the legal instruments governing both tools can be amended to expand their scope or introduce stricter conditions. Also, when the situation allows, for example, because of the target state's change in its behaviour, the controls can be eased, suspended and ultimately, lifted. It is essential to remember that these are distinct tools, often overseen by different offices or even departments within the state. Export controls continue to develop further at a high pace, as recent practice shows.

Sanctions

As discussed, the imposition of sanctions is a coercive measure in response to a threat or unlawful event. In particular, the sanctions imposed on Russia by the G7 members, alongside the EU and several like-minded states, following the further invasion of Ukraine in 2022,¹¹ receive much attention. Until recently, sanctions have not been deployed in this manner. Traditionally, UN sanctions were comprehensive tools aimed at a country as a whole, targeting most, if not all, sectors of its economy. In practice, these sanctions had a disastrous humanitarian impact on the civilian population, as they usually led to shortages of food, medicine, and medical supplies. As such, they proved to be the 'blunt and deadly weapons' that former U.S. President Wilson had predicted when he proposed the inclusion of sanctions as a collective coercive measure in the Covenant of the League of Nations, the predecessor to the UN.¹²

In response, from the 1990s onwards, the UN shifted towards imposing more targeted sanctions, focusing on specific sectors of a country's economy. These measures enable better protection for the civilian population and, today, often include specific exemptions for humanitarian reasons.¹³ UN sanctions against a country thus usually consist of multiple successive sanctions that can be adjusted, either increased or eased, depending on the targeted state's behaviour. Notably, this type of sanction is valued for its scalability, as Portela points out.¹⁴ A recent trend is the adoption of thematic sanctions. Unlike traditional sanctions, which address matters of international concern in relation to one or more particular countries, thematic sanctions address a specific norm violation in general. Examples include the use of chemical weapons or the violation of human rights.

Given that UN sanctions require a resolution from the UN Security Council, any of the permanent members may exercise their veto power over proposed sanctions. In such situations, individual states or regional organisations may adopt sanctions independently. In practice, these autonomous sanctions are also typically targeted

at specific sectors of the targeted state's economy, necessitating a series of interconnected, escalating sanctions across various areas of the economy to exert the desired pressure. Furthermore, unlike UN sanctions, which have a universal effect, autonomous sanctions only apply to the citizens and operators of the countries or member states that have adopted them. Consequently, states and organisations must closely coordinate to ensure their measures are sufficiently effective.

Additionally, they need to convince third countries, which are not bound by the sanctions, not to engage in actions that could undermine them ('circumvention'), as such conduct would significantly diminish the impact of the sanctions. Obviously, sanctions that impose direct obligations on operators in third states would be more effective, but they lack a clear basis in international law as these extraterritorial, secondary sanctions constitute an unjustifiable infringement on the sovereignty of those countries. Consequently, most states are reluctant to impose them, with the exception of the United States.¹⁵

Whereas sanctions are generally imposed in high-tension environments in response to illicit activities of a state that threaten global or national security or in response to a breach of a state's international obligations, they can already play a role at an earlier stage in a low-tension environment. The credible threat of imposing sanctions may deter a possible target state from certain activities that could otherwise lead to sanctions ('sanctions deterrence').¹⁶

Export restrictions

Admittedly, sanctions deterrence can be useful in a low-tension environment but in practice, mere threats may not always prove effective.¹⁷ Therefore, other tools play a more prominent role. Since the Cold War, export restrictions have appeared to be the tool of choice for many countries. This preference can partly be explained by the fact that the 2004 UN Security Council Resolution 1540 obliges states to adopt an export control system.¹⁸ But even before this resolution, the major supplier states of military and dual-items had such systems in place. The regulation of export restrictions seems to be in constant flux. In particular in the United States, amendments to the relevant regulations, such as the Export Administration Regulations (EAR) and the Traffic in Arms Regulations (ITAR), are frequent and often massive. In the EU, export control legislation is less frequently subject to such changes, although the applicable control lists are updated regularly.

Such updates by the United States, EU, and others often stem from decisions made within the multilateral export control regimes, particularly regarding the respective guidelines and control lists they maintain, such as the Wassenaar Arrangement's List of Dual-use Goods and Technologies and Munitions List,¹⁹ and the Nuclear Suppliers Group's trigger list.²⁰ As the control regimes lack legal status under international law,

unlike international organisations such as the UN and the EU, their decisions constitute political commitments rather than legally binding obligations.²¹ Nevertheless, the participating states, as well as the EU and several third states, incorporate the standards, lists, and their updates in national laws and regulations, thereby rendering them legally binding within their respective jurisdictions.

Another consequence of the non-legal status of the control regimes is that all decisions require consensus. In other words, for an item to be included in a control list, all states participating in the relevant regime must agree. Given current global tensions and power competition, this process becomes increasingly complicated as competing states, such as the United States and Russia, participate in the same regimes.²² Therefore, achieving consensus on listing new items is harder than ever. This is of particular concern as new technologies are developing at a rapid pace, necessitating a highly responsive regime structure.

An additional issue is that, due to the nature of the multilateral control regimes, the primary focus remains on controlling relevant items of concern rather than restricting end-users. Given the high political sensitivity of targeting end-users, the multilateral export control regimes have not adopted lists of restricted end-users.²³ However, the current international environment has prompted some countries to consider limiting exports of (certain) sensitive or critical items to specific states. This approach does not align with the regimes' original design. Therefore, states and organisations are increasingly pursuing *ad hoc* cooperation and coordination to address this issue outside the framework of the multilateral export control regimes. Notable examples include the meetings of the U.S.-EU Trade and Technology Council (TTC) and the collaborative efforts of Australia, the United Kingdom, and the United States under the AUKUS partnership. Such a development may lead to the introduction of *ad hoc* national legislation on issues of concern.²⁴ To this end, the Netherlands, for instance, has adopted national restrictions on the export of advanced semiconductor manufacturing equipment²⁵ and emerging technology items,²⁶ in addition to the restrictions in the EU Dual-use regulation.²⁷

Investment controls

As tensions in East-West relations gradually relaxed when the Cold War ended, the liberalisation of international trade in the late 1980s led to a notable expansion in foreign direct investments. Such investments by companies incorporated in another state (foreign companies) in domestic businesses (inbound investments) may present security risks for the state as the investments may entail the loss of control over the company and the transfer of technology to the foreign company. Consequently, many countries have traditionally imposed sectoral exclusions based on the strategic importance of certain industries, key infrastructure, and utilities.²⁸

In recent years, however, concerns have grown that foreign investments in other sectors may threaten national security, prompting the need for increased oversight. In the United States the Committee on Foreign Investment in the U.S. (CFIUS) is tasked with reviewing transactions for national security concerns based on the Defense Production Act of 1950.²⁹ In 2018, the Foreign Investment Risk Review Modernisation Act (FIRRMA)³⁰ was passed, expanding the scope of inbound foreign investments that are subject to review by CFIUS. A year later, the EU adopted a regulation establishing a framework for the screening of foreign direct investments into the EU.³¹ In the Netherlands, the Investments, Mergers and Acquisitions Security Screening Act³² was introduced to safeguard national security by mitigating risk associated with certain foreign activities, such as investments and mergers, related to critical suppliers (such as banks and airport and port management operators) or businesses holding sensitive technologies.³³ With respect to the latter, the government refers to items identified by the relevant multilateral export control regimes.

More recently, certain national investments in foreign countries, known as outbound investments, have come under greater scrutiny as well. In particular, investments in companies engaged in critical technologies may pose a national security risk, requiring close review of intended transactions. Only a few countries have implemented outbound investment controls so far.³⁴ Both the United States and the EU are in the process of adopting legislation in this area, driven by concerns that the investments can lead to the transfer of highly sensitive technologies and know-how.

In 2023, the US President signed an Executive Order³⁵ laying the foundation for further legislation on outbound investments (the Outbound Order).³⁶ In November 2024, the US Department of the Treasury issued a Final Rule implementing the presidential Outbound Order.³⁷ The Final Rule requires US persons to provide notification “...regarding certain transactions involving persons of a country of concern that are engaged in activities involving certain national security technologies and products that may contribute to the threat to the national security of the United States” and prohibits them from engaging in certain other transactions involving persons of a country of concern. The EU is slightly behind the United States in this respect. The European Economic Security Strategy, published in June 2023,³⁸ outlines a comprehensive approach to European economic security, emphasising the importance of existing export controls and highlighting the need to explore additional tools to control outbound investments. This process resulted in a Commission recommendation encouraging member states to start reviewing outbound investments in specific critical technologies, such as semiconductors, AI and quantum technologies to the EU member states.³⁹

Current practice

Sanctions

The recent developments in international sanctions are reflected in the “rolling programme of intensifying sanctions”⁴⁰ imposed on Russia following its annexation of Crimea and Sevastopol, as well as the destabilisation of eastern Ukraine in 2014. Initially, Russia was subject to a relatively limited set of targeted Western sanctions. These sanctions, and the implied threat of additional measures did not deter Russia from its further invasion of Ukraine eight years later. From 2022 onwards, the G7 members, the EU, and other partners have been implementing an ever-expanding array of unprecedented and coordinated sanctions, partly building upon the 2014 sanctions. These sanctions include asset freezes, travel bans, arms embargoes, trade restrictions, and sanctions on specific sectors of the economy, such as the defence industry, energy, transport, and finance. Additionally, countries supporting Russia’s war efforts, such as Belarus and Iran, are also subjected to targeted sanctions.

So far, third states facilitating circumvention of Western sanctions appear to have avoided direct consequences. Sanctioning states are strengthening cooperation with these third states and applying indirect pressure on economic operators to prevent circumvention activities.⁴¹ One example is the EU’s 12th package of sanctions against Russia,⁴² which requires EU exporters to include a ‘no re-export clause to Russia’ in all contracts involving certain sensitive items listed in the regulation outlining the package. Also, exporters are to ensure that the contract with the third-state counterpart contains adequate remedies in the event of a breach of the no re-export clause.⁴³ Similarly, the 14th EU package of sanctions,⁴⁴ adopted in June 2024, requires EU operators transferring know-how for the production of military items to third-country commercial entities to include certain contractual clauses designed to ensure that such knowledge is not used for goods intended for Russia. A potential next step could involve the imposition of secondary sanctions targeting individuals and operators in states that fail to take effective action against the circumvention activities. However, given the legal challenges surrounding secondary sanctions, it is unlikely that this will occur in the near future.

Sanctions serve as a scalable tool for Western states to weaken Russia’s economic and financial base and restrict its ability to continue to wage war.⁴⁵ Just as these sanctions are gradually expanding and intensifying, they could also be eased and ultimately lifted. A recent example, although not directly related to the conflict, is the 2018 Joint Comprehensive Plan of Action (JCPOA), commonly referred to as the ‘Iran nuclear deal’. Following controversies around Iran’s nuclear programme, Iran, the P5+1,⁴⁶ and the EU negotiated a plan whereby Iran would restrict its nuclear programme in exchange for relief of international sanctions. The JCPOA

also included a snap-back clause that provided that the sanctions would be reimposed if Iran was found to be non-compliant with the provisions of the deal. However, such a process seems highly unlikely in the conflict in Ukraine, as Russia appears determined to continue the hostilities, committing various international crimes along the way.

Export restrictions

Export restrictions differ from sanctions in many ways and, consequently, have a distinct legal basis and are administered by other departments. Nonetheless, there are intersections between the two, and, depending on the jurisdiction, they can sometimes overlap. Export control regulations generally connect with sanctions law through clauses prohibiting the export of strategic items when doing so would conflict with sanctions regulations. In the EU, rules governing sanctions and export restrictions remain strictly separate. In response to the further invasion of Ukraine in 2022, the EU did not amend its legal documents on export restrictions, such as the EU Dual-Use Regulation and the Common Position on exports of military items.⁴⁷ However, EU restrictive measures (sanctions) as set out in Council Decisions and implemented in Council Regulations contain numerous provisions that would qualify as export restrictions were it not for the distinct legal basis.

In the United States, the distinction between sanctions regulations and export control regulations is less pronounced, especially with respect to items subject to the EAR. An early example of this overlap is the 1982 Soviet Pipeline Regulations.⁴⁸ Following the Soviet Union's support for repression in Poland, the U.S. amended the EAR to impose sanctions on the Soviet Union rather than adopting separate sanctions under the International Economic Powers Act of 1977, typically the primary basis for U.S. economic sanctions. Recent practice indicates that export restrictions under the EAR are now frequently employed to supplement sanctions, as seen with the current sanctions targeting Russia and its allies. Since the adoption of the sanctions, exports from the United States to these countries have been further limited by specific export restrictions under the EAR. The first in a series of amendments to the EAR was the Final Rule "Implementation of Sanctions Against Russia Under the Export Administration Regulations (EAR)", which introduced significant new controls on the export of items subject to the EAR to Russia.⁴⁹ In pace with the tightening sanctions on Russia, export restrictions are frequently updated, further restricting exports to Russia.

In general, however, export restrictions in the United States, as well as in other jurisdictions, are adopted independently of sanctions and are often introduced in response to rising geopolitical tensions. A case in point is the ongoing power competition between the United States and China. In 2015, China set out its economic

ambitions in a 10-year plan titled ‘Made in China 2025’ promoting domestic innovation and technological advancement.⁵⁰ Under China’s ‘Military-Civil Fusion’ initiative, civilian operators are required to share their technology with the military sector.⁵¹ Consequently, advancements in the civil domain directly bolster China’s military capabilities, potentially positioning China for military dominance. These developments have led the United States to tighten export restrictions to China significantly since 2018, particularly targeting advanced technologies such as advanced semiconductors, artificial intelligence, and quantum computing. These measures aim to restrict China’s access to critical technologies that could enhance its military capabilities and strategic influence.

The United States has imposed these restrictions outside the framework of the multilateral export control regimes. To ensure their effectiveness, the United States needed other states to align their position, requiring *ad hoc* coordination with like-minded partners.⁵² A notable example is the U.S. restriction on the export of advanced semiconductor manufacturing equipment to China. Since countries like Japan and the Netherlands are prominent exporters of such equipment, the United States had to negotiate agreements with these countries to similarly limit exports. In the Netherlands, this process led to the adoption of the Ministerial Order advanced semiconductor manufacturing equipment in 2023.⁵³

Foreign direct investments

Just as export restrictions differ from sanctions, foreign direct investment screening differs from export restrictions because each operates under a distinct legal framework and is administered by separate governmental departments. However, they share a common objective: preventing foreign entities from acquiring strategic items. Notably, foreign direct investment screening appears to be narrowing its focus in terms of items as well as countries of concern. Specific emerging technologies, in particular advanced semiconductors, AI, and quantum technologies, have become a driving force behind the recent amendments to inbound investment screening and the introduction of outbound investment screening legislation in the United States and the EU. An EU White Paper, in particular, refers to “...the risks of technology and know-how leakage as a result from outbound investments ... in a narrow set of advanced technologies that could enhance military and intelligence capacities of actors who may use these capabilities to threaten international peace and security.”⁵⁴

While all screening instruments have general applications and do not explicitly target specific states, it is clear from preparatory documents and explanatory notes that China is the primary country of concern, although it is certainly not the only one.⁵⁵ The EU Regulation for screening foreign direct investments into the EU was

adopted partly in response to concerns about growing investments by Chinese companies in Europe and the growing influence of Chinese investors.⁵⁶ The European Economic Security Strategy's paragraph on outbound investments specifically refers to "destinations of concern that operate civil-military fusion strategies",⁵⁷ a clear reference to China.

As both the United States and the EU prioritise critical emerging technologies, the object of protection for this tool closely aligns with that of export restrictions⁵⁸ to the extent that the two are almost merging.⁵⁹ While investment controls, in particular those concerning outbound investments, remain a developing tool, they nonetheless play a role in the broader discussion on the use and evolution of export control tools.

Implications

Recent developments and practices underscore the growing significance of export control measures as a scalable foreign policy tool to address national and global security threats. In the context of ongoing armed conflicts, particularly following Russia's further invasion of Ukraine, alongside the resurgence of great power competition, the world is witnessing a continuous up-scaling in the application of export control measures. This process is further reinforced as existing international frameworks for maintaining peace and security, as well as for developing export restrictions, increasingly yield to ad hoc measures implemented by individual states and international organisations.

UN-imposed sanctions are increasingly being supplanted by a growing array of autonomous sanctions introduced by individual states and regional organisations. Similarly, multilateral export control regimes, traditionally responsible for implementing arms control treaties, are facing difficulties in reaching consensus on the control of items, particularly in relation to emerging technologies. In response, states are increasingly resorting to new, ad hoc multilateral consultation frameworks to coordinate export restrictions on specific items, often with a focus on targeting particular countries (such as the U.S.-EU Trade and Technology Council (TTC) and the AUKUS partnership).

Scalability in the field of export controls appears to come at a cost. Autonomous sanctions and ad hoc regulations may undermine the efficacy of these measures due to their lack of universal applicability. Furthermore, reliance on such mechanisms generates increased uncertainty regarding the future trajectory of export controls, necessitating substantial effort from stakeholders to navigate the continually shifting landscape. Ultimately, this trend contributes to a progressively complex and fragmented legal framework. This framework is characterised by an extensive

and intricate patchwork of interrelated autonomous sanctions and domestic rules governing export restrictions on specific goods and targeted states.

On a practical level, both governmental bodies and companies are faced with the practical implications of the ever-increasing number of tightening sanctions, export restrictions and foreign direct investment screenings. At the governmental level, the responsible departments and agencies must design, implement, and enforce the growing number of export controls. Since sanctions, export restrictions, and foreign direct investment screenings intersect and increasingly overlap, close inter-agency cooperation is required across a state's administration and, where appropriate, in close coordination with the EU. This coordination necessitates additional capacity within the departments and further reinforces bureaucracy.

The continuous process of up-scaling of export controls also presents significant challenges for businesses. Operators must ensure, for example, that the companies and individuals they engage with are not listed on sanctions or restricted persons lists; that the products they trade, transport, or store comply with all export requirements; and that items do not reach sanctioned parties through circumvention. Non-compliance with these measures can have far-reaching consequences, such as reputational damage, administrative fines, licence revocations, or even criminal prosecution of executives. To mitigate risks, businesses must invest in robust compliance systems capable of continuously monitoring the evolving regulatory landscape and adapting business processes accordingly. However, small and medium businesses often lack the means to establish such a compliance system.

Synthesis and conclusion

Export controls provide states with tools to address today's threats to national and global security, ranging from sanctions to export restrictions, to foreign direct investment screening. The latter two tools are regular trade instruments that can operate independently of inter-state tensions and can be applied in both low-tension and high-tension regional or global environments. Both are preventive in nature, requiring an *ex ante* review of certain exports and foreign investments. Sanctions, by contrast, have a repressive character and are applied *ex post* in response to a particular event, generally in a high-tension environment. The threshold for imposing sanctions is high, typically requiring a breach of international peace or security or of an international obligation of a state. Although sanctions can have a signalling purpose, they are in general intended to 'induce a change in policy or behaviour'. Therefore, they are coercive measures designed "to inflict pain".⁶⁰

In the past years, export controls have been in continuous flux, as recent developments and present practices show. Export control tools are playing an increasing

role in addressing economic and broader security threats, both nationally and internationally. These tools form a scalable array of measures through which a state can implement its foreign policy objectives. Export restrictions may be imposed at any time to mitigate security risks, typically by controlling items specified in the lists established by the international export control regimes. However, as international relations face increased strain, certain states may coordinate controls targeting particular countries of concern, further restricting the export of strategic items to these jurisdictions. Enhanced cooperation and coordination between states in this area have given rise to new national regulations focused on the oversight of strategic items. Notably, in lower-tension environments, export restrictions may now be complemented by the screening of outbound and inbound foreign direct investments. When international tension rises, sanctions are a further tool to address situations where a state breaches its obligations under international law or where international peace and security are threatened.

In the context of the ongoing armed conflict between Russia and Ukraine and together with the growing competition between China and the United States, a process of up-scaling of the application of export control measures is ongoing, creating a complex and fragmented legal export control framework. The process has a significant impact on the capacity and daily operations of both government and businesses. While the former is facing the challenges of greater inter-agency coordination and cooperation, the latter must ensure it meets all due diligence requirements in order to avoid the consequences of non-compliance with all export control measures.

Notes

- ¹ Items which can be used for both civil and military purposes. An example is dimethyl methylphosphonate, a flame retardant additive (dual-use) that can also be used to produce chemical weapons (military use).
- ² The G7 is an informal forum where leaders of some of the key states of the international economic system (Canada, France, Germany, Italy, Japan, the UK, and the US) meet to discuss current world-issues.
- ³ For example, for an analysis of the effectiveness of sanctions against Russia, see: Itskhoki and Ribakova, "The economics of sanctions: From theory into practice." and De Bruin et al., "Does the Russia sanctions revolution bring about change?", 277–292.
- ⁴ De Bruin et al., "Does the Russia sanctions revolution bring about change?", 279.
- ⁵ The Genocide Network, "Prosecution of sanctions (restrictive measures) violations in national jurisdictions: A comparative analysis, expert report", 8.
- ⁶ Articles 39 and 41 of the UN Charter.
- ⁷ Article 49 of the Draft articles on Responsibility of States for Internationally Wrongful Acts.

- ⁸ Cornerstone treaties include: the 1970 Non-Proliferation Treaty, the Biological Weapons Convention, the Chemical Weapons Convention, and the Convention on Certain Conventional Weapons.
- ⁹ Cf. Joyner, “Strategic trade controls”, 121–130.
- ¹⁰ Organisation for Economic Co-operation and Development iLibrary. Foreign direct investment (FDI) | OECD iLibrary (oecd-ilibrary.org).
- ¹¹ The sanctions build on measures taken against Russia following its annexation of Crimea and Sevastopol, as well as the destabilisation of eastern Ukraine in 2014 (see below).
- ¹² Voetelink, “International Export Control Law: Mapping the field”, 69–94.
- ¹³ For example, UNSC Resolution 2664 of 9 December 2022 introducing a standing humanitarian exemption to the asset freeze measures imposed by UN sanctions regimes.
- ¹⁴ Portela, “EU horizontal sanctions and the courts: Questions of interface”, 33.
- ¹⁵ In the past, the United States has frequently imposed secondary sanctions, *inter alia*, targeting Cuba, Iran, and Russia. These measures have been met with broad international criticism.
- ¹⁶ Demarais, “Hard, fast, and where it hurts: Lessons from Ukraine-related sanctions for a Taiwan conflict scenario”.
- ¹⁷ Demarais, “Hard, fast, and where it hurts”.
- ¹⁸ This decision is binding upon all UN member states under Article 25 of the UN Charter. Given that the primary objective of Resolution 1540 is to prevent weapons of mass destruction from being acquired by non-state actors, it logically necessitates that UN member states establish export control systems.
- ¹⁹ See: Control lists – The Wassenaar Arrangement.
- ²⁰ See: Updated NSG Guidelines Part 1 – Trigger List.
- ²¹ For example, De Bruin, “Export control regimes-Present-day challenges and opportunities”, 31–53.
- ²² For example, Junusova and Reinsch. “Rethinking the Wassenaar Minus One Strategy”.
- ²³ Joyner, “Strategic trade controls”, 124.
- ²⁴ For an overview, see: Junusova and Reinsch. “Rethinking the Wassenaar Minus One Strategy”.
- ²⁵ The 2023 Ministerial Order advanced semiconductor manufacturing equipment (in Dutch: ‘Regeling geavanceerde productieapparatuur voor halfgeleiders’).
- ²⁶ The 2024 Ministerial Order on additional control measures to the Dual-use Regulation (in Dutch: ‘Regeling aanvullende controlemaatregelen op de Verordening producten voor tweeeerlei gebruik’).
- ²⁷ Article 9 of the EU Dual-use Regulation permits member states to adopt national rules restricting the export of items not listed in the Regulation, based on national security concerns.
- ²⁸ In the Netherlands, for example, sector specific investments reviews are required under the Gas Act, Electricity Act 1998, and Telecommunication Act.
- ²⁹ The Defense Production Act of 1950, as amended [50 U.S.C. § 4501 et seq.]; Abrams et al., “Rare Executive Order sharpens CFIUS focus.”.
- ³⁰ Foreign Investment Risk Review Modernization Act of 2018, Pub. L. No. 115-232, §§ 1701-28, 132 Stat. 2174.
- ³¹ Regulation (EU) 2019/452 of the European Parliament and of the Council of 19 March 2019 establishing a framework for the screening of foreign direct investments into the Union (Official Journal (OJ) L 79I, 21.3.2019).
- ³² Wet veiligheidsstoets investeringen, fusies en overnames (Vifo).
- ³³ Dutch Parliamentary Papers 2020–2021, 35 880, nr.3, p. 2 (Explanatory Note, Draft Investments, Mergers and Acquisitions Security Screening Act).
- ³⁴ Japan and China; Vleeshouwers and Beetstra, “EU Commission takes cautious steps towards screening of outbound investments.”

- ³⁵ Executive Order 1410 on Addressing United States Investments in Certain National Security Technologies and Products in Countries of Concern, 9 August 2023, ‘The Outbound Order’. At: <Executive Order on Addressing United States Investments in Certain National Security Technologies and Products in Countries of Concern | The White House>.
- ³⁶ On 7 May 2024, the Office of Investment Security of the Department of the Treasury published a Proposed Rule entitled: Provisions Pertaining to U.S. Investments in Certain National Security Technologies and Products in Countries of Concern (89 Fed. Reg. 55846, 5 July 2024 <2024-13923.pdf>).
- ³⁷ “Provisions Pertaining to U.S. Investments in Certain National Security Technologies and Products in Countries of Concern”, effective: 2 January 2025; Federal Register: Provisions Pertaining to U.S. Investments in Certain National Security Technologies and Products in Countries of Concern.
- ³⁸ Joint Communication by the European Commission and the High Representative of the Union for Foreign Affairs and Security Policy, European Economic Security Strategy.
- ³⁹ Communication from the Commission, Guidance to the Member States concerning foreign direct investment from Russia and Belarus in view of the military aggression against Ukraine and the restrictive measures laid down in recent Council Regulations on sanctions (OJ C 151 I, 6.4.2022).
- ⁴⁰ Mills, “Sanctions against Russia”, 11 ff.
- ⁴¹ Mills, “Sanctions against Russia”, 55 ff.
- ⁴² Council Regulation (EU) 2023/2878 of 18 December 2023 amending Regulation (EU) No 833/2014 concerning restrictive measures in view of Russia’s actions destabilising the situation in Ukraine (OJ L 2023/2878, 18.12.2023).
- ⁴³ Article 12g of Regulation (EU) No 833/2014 (consolidated).
- ⁴⁴ Council Regulation (EU) 2024/1745 of 24 June 2024 amending Regulation (EU) No 833/2014 concerning restrictive measures in view of Russia’s actions destabilising the situation in Ukraine (OJ L 1, 24.6.2024). See Article 12ga of the consolidated Regulation.
- ⁴⁵ For example, Mills, “Sanctions against Russia”, 49.
- ⁴⁶ The five permanent UN Security Council members and Germany.
- ⁴⁷ Regulation (EU) 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items (recast) (OJ L 206, 11.6.2021) and Council Common Position 2008/944/CFSP of 8 December 2008 defining rules governing control of exports of military technology and equipment (OJ L 335, 13.12.2008).
- ⁴⁸ The Soviet Pipeline Regulations amending the Export Administration Regulations, 47 Fed. Reg. 27250; Moyer and Mabry 1983, p. 69ff. These measures were implemented in regulations issued pursuant to the Export Administration Act of 1978 (47 Fed. Reg. 141, 144 (1982)).
- ⁴⁹ 87 Fed. Reg. 12226. At: 2022-04300.pdf (govinfo.gov).
- ⁵⁰ Lim et al., “China export controls 2.0.”, 12.
- ⁵¹ Hellendoorn, “China’s capital market in the shadow of the CCP”.
- ⁵² Junusova and Reinsch, “Rethinking the Wassenaar Minus One Strategy”.
- ⁵³ In Dutch: ‘Regeling geavanceerde productieapparatuur voor halfgeleiders’.
- ⁵⁴ European Commission 2024, White Paper on Outbound Investments, 24.1.2024, COM(2024) 24 final, 2.
- ⁵⁵ In particular Russia; European Commission 2022, “Communication from the Commission”, 2.
- ⁵⁶ Dominika Pietkun, “The European commission filling gaps in the FDI screening Regulation in the face of the war in Ukraine”, 110.
- ⁵⁷ Joint Communication by the European Commission and the High Representative of the Union for Foreign Affairs and Security Policy, European Economic Security Strategy, 11.

- ⁵⁸ Von Rummel and Gözl, “US outbound investment control: A model for the EU?”, 22.
- ⁵⁹ Rand et al., “Emerging technologies and trade controls: A sectoral composition approach position. navigation, and timing; quantum computing; computer vision.”, 17.
- ⁶⁰ Nephew, *The art of sanctions: A view from the field*, 9.

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Discussion and conclusions

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The art of scaling

The first quarter of the 21st century ended with an urgent wake-up call: geopolitical tensions are on the rise; war has returned to European soil and President Putin's expansionist ambitions are acutely felt in Eastern Europe. Meanwhile, the Indo-Pacific grey zone threats continue to escalate, and both Russia and China are actively working to destabilise Europe. Internal crises are also looming. Since the return of President Trump, the traditionally robust transatlantic bonds within NATO have shown considerable signs of strain, raising questions about the reliability of the dedication of individual NATO members to Article 5, the cornerstone of the NATO treaty. This backdrop underlines that current geopolitical challenges have reached a critical juncture – one that could be existential for our social and security frameworks; this raises a pressing question: can European NATO members truly project power if they lack the necessary military capabilities for credible deterrence? Moreover, can a divided Europe, with its fragmented defence capacity, effectively withstand and respond to today's geopolitical pressures, and possibly, the threat of war?¹

For instance, Danish intelligence indicates that if the war in Ukraine ends (either in peace or frozen conflict), Russia could rebuild its armies within five years, once again posing a threat to NATO's borders.² Reflecting similar analyses, Dutch policymakers have stated that the Netherlands must prepare for a potential Article 5 conflict with a peer adversary within three to five years. This radical shift in our threat environment underscores the need for equally radical organizational change. Simply put, nations should prepare military, political, and societal systems to deter – or, if necessary, engage in – wars of necessity.

Against this backdrop, it is also worth asking if our Western societies are truly resilient. This goes beyond merely withstanding external adversaries or stocking an emergency kit to survive the first 72 hours of a crisis. The deeper question is whether our social fabric is robust and whether we are devoted and mentally prepared to defend our core values.³ Or is the social fabric under pressure by rampant individualism, disinformation, and social media rabbit holes in which our neighbours seem like strangers, and the government no longer appears to be a trustworthy institution?⁴ This challenge extends beyond national preparedness; it impacts society at large, and various analyses indicate that, here too, cracks have

widened.⁵ The core issue therefore is how we, as a community, can become more resilient to whatever lies ahead (see chapter 12). This is a responsibility shared by governments, businesses, civil society organisations, research institutions, and citizens alike (see chapter 11). Observing that our fundamental values and society at large are under pressure is easy; however, finding effective solutions is much more difficult.

This is all the more urgent since society is more than the sum total of its individual members; it takes substantially longer to rebuild mutual trust than to destroy it. Likewise, it takes considerably more time to instil trust in institutions than to question their legitimacy, and it is far more costly to rebuild infrastructure after the destruction brought upon it by war, than it is to strengthen the military to prevent one. In addition, if society is called upon to pay, and if need be, bleed for the security of our borders or the scalability of the armed forces, it is reasonable to suspect that its members will be more willing to do so if they perceive society itself as just. Scalability must be seen as mutually beneficial in order to be feasible. Scalable armed forces must thus be able not just to deter or fight a near peer. They must likewise be able to provide support to civilian authorities in case of natural disasters, piling sandbags, providing emergency medical aid, and distributing food. In fact, the current focus on Main Task 1 – the protection against outside attack – is somewhat misguided in that even in such a scenario the, arguably scaled, armed forces will be called upon to carry out duties normally associated with Main Task 3 – supporting civilian authorities. It is conceivable that they will simultaneously be deployed to conduct operations of a peace-enforcing kind, i.e., they may have to fight insurgents and enemy stay-behind personnel in order to create conditions in which they can safely support local authorities. Main Tasks 1 to 3 are part of a continuum.

This new reality calls for adaptive and resilient systems. To this end, the authors of this book – academics from various backgrounds and military practitioners – have endeavoured to better define the concept of scalability itself by trying to find answers from various historical, operational, organisation and management perspectives. Historically, the period from 1991 to 2022 was a uniquely low-threat era for Europe, but the Netherlands has faced existential threats before that called for upscaling. In the first part of this book, De Jong, Baudet, and Hoffenaar and Sanders (Chapters 1–3) highlight how defense was approached in earlier times, when nations balanced financial sustainability, popular support and maintaining a reliable military force, capable of protecting the state. After all, countries can go bankrupt fighting wars or, conversely, risk lagging behind in technology by building up forces too early. Therefore, nations adopted scalability to provide viable deterrence and response to war and crises. Scalability is visualized by Bogers et al. in Chapter 16 through an analysis on NATO defence expenditures after the Cold War.

Their chapter illustrates that changes in NATO defence spending are not always driven by the presence of international threats but also on availability of resources. Additionally, their statistics clearly show downscaling during the post-Cold War period and upscaling after Russia's invasion of Ukraine in 2022. NATO member states seem to prioritise scaling up their armed forces through material equipment expenditures rather than personnel expenditures as contemporary conflicts are increasingly driven by advanced military technologies and a lack of personnel as Chapter 11 suggested. Lastly, Chapter 15 provides a historical review on education in wartime during the Second World War, and compares it with Ukrainian experiences and European staff colleges. It concludes that military education is a critical pillar to sustain war efforts and gain intellectual advantage, promotes learning and innovation. To organise this, de Ruiter recognises four phases of organising in conflict. Each phase needs to find balance between sufficient staffing for armed forces in the short term and sustainment of the military through military education in the long term.

A cluster of chapters dig deeper into organising (Chapters 4–11) and sustaining scalability (Chapters 12–18). Scalability refers to systems, networks or organisations that can change their structures and output *in size* to meet the demands of their environment.⁶ Economies of scale offers an efficiency perspective on scalability as it deals with the cost advantages that arise when a firm increases its production output, thereby improving operational *efficiency* and reducing the average cost per unit.⁷ Especially in the light of current geo-political, technological and societal developments, the question remains whether only increasing in size is enough. Most writers of this volume propose a potential for *combinatorial scaling* in terms of active organising, innovation and an open mindset, suggesting possibilities for more adaptable mechanisms. In other words, scalability in the security domain is not just about increasing or decreasing the scale of available capacities, it is also about the ability to adapt the form and function of the scalable organisation itself (see Chapters 4–7). Fenema et al. suggest a multiple stream model (military and non-military) to activate a civil-military industrial base to supply and sustain military operations. They argue for convergence of industries and the military to realise scalability, especially in times of instability. This requires alternative governance models in times of crises to include citizens and private companies in security systems. In times of stability, free-market mechanisms and decentralised governance are more applicable while times of adversity call for more hierarchical, centralised and directive governance.⁸ Within the Western political-societal contexts, this requires *foresight*, *flexible capabilities* and *long-term commitment and assurances* from policy makers and companies alike. These assurances, combined with trusting relationships, are crucial to bridge the civil-military gap that currently hinders the development of new capabilities in defence industries.

To organise scalable innovation, Verhulst (Chapter 5) introduces generativity in the context of scalable innovation. Generativity is an evolutionary perspective on change⁹ describing interaction between an organisation's social and technical elements leading to emergent (re)combinatorial innovation as source of variation and innovation. Combinatorial innovation emerges over *time*, is *hard to control* and is based on multiple feedback loops across different organisational layers. In dealing with an ambiguous and uncertain environment, organisations can innovate complex technologies, requiring a strategic shift from predictability and internal optimisation towards emergent outcomes and embracing the unpredictable output of innovation. For instance, since the start of the Ukraine war, various innovations have emerged through interaction (feedback loops) with the operational environment based on reconfigurations of existing technologies (bricolage), which provided dynamic capabilities to cope with the disturbed environment.¹⁰ Kramer et al. show challenges of innovation with multiple stakeholders. In particular, the challenges of scaling innovation of sociotechnical systems (i.e., robots that interact with their social environment) in large bureaucracies (the military and MoD's policy departments). They plead for strategic reorientation and discretionary flexibility throughout innovation processes. Additionally, they warn of stove pipes in innovation processes as a result of which innovation disconnects from operational reality. Consequently, they underline the importance of *sensemaking processes* amongst users, designers and leadership on different organisational layers, throughout the process of design to avoid mismatches and false expectations.

In applying the concept of scalability, Dado et al., introduce Legislation (Chapter 6). Based on the simplicity of LEGO blocks, the principle is modular construction and standardisation of systemic components. From a broader perspective, this concept introduces standardised components to increase scalability of military systems. This approach reiterates the principles of economies of scale (efficiency) because less individual components are needed. Van Lit (Chapter 7) argues for a layered, combinatorial approach on scalability to prepare for large scale operations. He shows that scalable systems need a solid resource base. Next, bundles of resources should be configured into capacities (e.g., combinations of materiel, personnel, support, plans and command systems) that can produce output (e.g., operational readiness, fighting power or credible deterrence). To configure additional resources into a coherent system, and routines are necessary to upscale the core organisation. In line with this thinking, Goes et al. explore the principles of scalable healthcare systems during large scale war. Based on a simulation, they conclude that medical scalability on the grass root level requires: (1) civil-military interoperability, (2) specific equipment to realise evacuation and (3) improved mandatory medical training. In addition, they argue for a *time perspective* on scalability, as altering policies and plans needs preparation and time for implementation. In

organising the complexity of scalability, Van Loon and Mastebroek argue that organisations benefit from mission command (Chapter 10). This way of command promotes the alignment of operations with higher-level objectives, promotes work floor initiatives and is enabled by a clear intent, trust and mutual understanding. Despite its advantages to organise scalability, implementing mission command is challenging as military culture is based on hierarchical control and supported by immense bureaucracy.¹¹ This calls for critical reflection on military culture to improve leadership in scalable organisations.

The last part of the book explores how to enable scalability of the armed forces. Moelker & Noll raise the question whether all voluntary forces are able to meet the requirement of scalability in large conflicts (Chapter 11). Due to shortages in the European labour market, all volunteer forces are understaffed, urging alternative staffing models, ranging from conscription, large pools of reservists and homeland defence forces, to voluntary conscription for one year. However, compulsory (selective or general) conscription is inescapable should the Netherlands become confronted with the prospect of large-scale war. Despite its disadvantages of motivation issues and ethical discussions, conscription is essential for maintaining a sufficient pool of military reservists – a critical factor for scalability. Moreover, incorporating women into conscription promotes inclusion and enhances a gender balance within the armed forces.

The next chapters of this book explore creative ways of recruitment and scaling of knowledge. Internal crowdsourcing – gathering ideas and solutions from volunteering employees – can extract tacit expertise and enhance the capability of knowledge and intelligence production. Both chapters underline recognising ‘hidden’ capabilities from civilian experts and military officers outside intelligence organisations. The authors propose the development of platforms to extract knowledge and organise (civil-military) interaction. However, this approach comes with challenges as well. In practice, it is challenging to fit emergent initiatives into rigid bureaucratic structures, as discussed in Chapter 10. In addition to this, legal mandates prevent stronger connections between grassroots initiatives at (military) operational level, civilian (external) actors and military secretive organisations. To enable the establishment of new connections, the authors argue for *accessible* platforms such as symposia or working groups on specific themes at which experts can meet each other. In addition to these creative ways of thinking, Chapter 17 explores the role of private equity in enhancing military industries. Although private equity can support quick upscaling, its short-term focus and high interest rates undermine stability and assurances needed for credible defence industries.

Towards a new definition of scalability in the context of crises and war

The chapters with historical analysis, organisation and management theory, and empirical examples on scalability provide refined building blocks to theorise towards new definitions and meanings on scalability in military contexts. We underline that scalability entails more than merely increasing operations or adding military units¹². It requires a fundamental mental shift from austerity to investment in resilient, interconnected civil-military systems. This also includes the adoption of development and change, and alternative modes of governance, technologies and leadership (see Chapters 4 and 10).¹³

Scalability is a capability of a system to increase its resource base, to cope with current and future environmental demands to ensure competitiveness¹⁴. Therefore, an organisation adapts its internal processes to increase their output, overall performance,¹⁵ sufficient resources,¹⁶ increased efficiency,¹⁷ and the potential for innovation to ensure operational readiness. This requires situational understanding of highly uncertain environments to identify events impacting current and future demands on the organisation.¹⁸ Dynamic capabilities theory can explain how to implement scalability in military systems (see Chapter 5).¹⁹ First, a system should *sense opportunities* and new technologies. Next it *seizes* opportunities in the new environment. By doing so, the organisation needs to reconfigure its strategies, organisational design, and gain additional resources. This also may well involve the enactment of entirely new roles, routines and organisational structures to deal with a disturbed environment²⁰ (see Chapters 4–7). Furthermore, adjusting the size of the organization also requires formalisation of routines, structures, operations, and network connections that enable scalability.²¹ Time and pacing are at the heart of scalability,²² requiring leadership and sensitivity to the larger environment. Scaling too early may result in outdated materiel and plans at the time they are needed. However, when the decision to scale up is made too late, countries risk existential negative consequences. Lastly, after the conflict ends or threat levels decrease, military systems should scale down again, but not necessarily to the situation of before the scale up, it should maintain a manageable but a stable resource base.

Based on these considerations, we define scalability as: *‘the capability of a system, network, or organisation to flexibly adjust the quality and size of its resources, routines, structures, operations, and network connections – by expanding or contracting its capacity over time. These adjustments aim to enhance overall performance, resource efficiency, and innovation capacity in order to meet both current and future demands in rapidly changing and ambiguous environments.*

Towards a process model of scalability

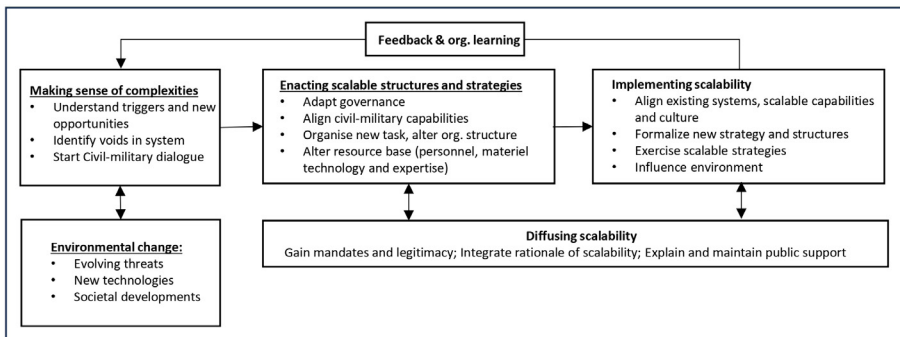
Based on the different chapters, we developed a process model of scalability consisting of three iterative stages including sensemaking, enactment and implementation (see figure 19.1),²³ scalability starts with a complex process of sensemaking²⁴ which involves understanding how a single (high impact) trigger or an accumulation of triggers, potentially develops into existential threats. In addition, politicians and experts need to interact and assess whether existing systems are resilient or need additional scalable features. Established governmental institutions alone are not capable of realising sufficient scalability through centralised governance (see Chapter 4). Implementing additional measures urges a dialogue among societal, military, and political actors to gain and maintain societal support to explain investments in scalable systems and explain its rationale to the larger population. In addition, civilian and military institutions provide an overview of potential threats and opportunities, fueling research and development on innovation and focal points for scaling.

In the next phase, an organisation can adapt to altering demands, transforming its outlines, routines and practices. To realise this, the military, civilian crisis management organisations, businesses, NGOs and citizens can engage in multi-organisational network collaboration to align existing capabilities or develop new capabilities. Making alliances enlarges the resource base because it allows for more configurations of existing resources. In particular, upscaling requires a stable resource base, redundancy and flexible investments for additional resources in accordance with emerging threats (Chapter 16). In purchasing new equipment, we advocate for ‘economies of scale’ to reduce costs, because centralised production or procurement by multiple countries can enhance product quality and security of supply. Depending on the context, this specific aspect of scaling requires either centralised ways or shared ways of governance (see Chapter 4). More specifically, based on the political process, decisionmakers can alter regulatory frameworks and governance modes, adding scalable features to deal with increased threat levels. For instance, to provide the necessary mandates for upscaling and to deal with grey zone threats in the preamble to war, the Netherlands is working on the law on military readiness. Lastly, politicians can explain and diffuse the rationale for scaling, showing its necessity to the population and actively diffusing scalability through discursive legitimisation strategies and action. Crisis managers and officers can implement scalability, into operational frameworks and plans.

In the last phase, organisations implement new strategies and align their scalable features with their existing capabilities and strategies. Scalability can further flourish through experimenting with new technologies and ways of organising to gain strategic advantage on potential adversaries. If threats increase, political leaders activate their scalable toolbox including diplomatic, information, economic and financial, intelligence and law enforcement capabilities to react properly (see

Chapter 18). Finally, the organisation translates its learning experiences to new competences based on feedback cycles (see Chapter 5). This requires active organising, and assessing whether existing capacities still meet future demands or whether adaptation is needed to increase resilience. Through these steps, sustainment of scalable systems can be realised. Scaling is therefore an ongoing process and hard to control. It rather represents a continuous process of learning, practice, feedback, formalisation and alignment. The closer to a potential conflict, and even during conflict, these wheels need to turn faster to keep competitive advantage on adversaries.

Figure 19.1: Proces Model of Scalability



Challenges of scalability

Making sense in turbulent times

Despite the availability of sophisticated technological tools and extensive indicators, effective sensemaking remains a significant challenge in practice. Unexpected events often unfold in rapid succession and potentially overwhelm sensemaking capacities of teams responding to adversity. This complicates efforts to maintain a comprehensive overview. Additionally, much information remains inaccessible or is hidden within vast data repositories.²⁵ Moreover, the intricate interconnectedness of modern systems can lead to unforeseen chain reactions that are nearly impossible to predict, as evidenced by events such as the Arab Spring and the famous spaghetti slide of general McChrystal.²⁶ In this context, Weick argues that understanding chaotic events requires action, because acting generates new information and reveals previously obscured options. In other words, a complete picture will never emerge if we keep analysing data; we need to interact with the environment. In addition to this, aiming for a complete picture may increase the risk of tunnel vision. Referring to the continual questioning of assumptions

that constitute the analysis, Kramer (2007) advocated “organizing doubt”.²⁷ This also requires sensitivity of commanders in dealing with the humility of experts, referring to the fact that experts tend to reserve their judgements in addressing potential threats to a system. Additionally, the perceived level of threat plays a significant role, as habituation can diminish the perceived necessity of action and maintaining scalability over time.

Translating conclusions into plans and strategies

Translating threats to plans, and plans into action is even more problematic. Although there is war ongoing on European soil, there are still NATO countries who do not conform to the 2% GDP norm. This complexity stems from politicians who have to deal with uncertainty of emerging threats and sell their plans to the larger public while maintaining public support.²⁸ During the COVID-19 crisis for instance, to retake control of the virus, impressive dashboards were developed to track the virus; including associated measures.²⁹ However, in practice these plans were never strictly followed and even lead to tunnel vision on infections, rather than looking for societal impact. Instead, policymakers sought a balance between the effectiveness of measures and public acceptance.³⁰ Designing plans and routines offers guidance to practitioners in upscaling. Examples include the U.S. incident command system, providing standardised scaling procedures in responding to crises on operational level. In case of an emergency, one is the appointed leader and emergency services fill different parts of the organisation. This system is praised for its reliability and simplicity due to its centralised way of control and standardised way of upscaling.³¹ However, it is questionable whether such a system works in decentralised countries like the Netherlands.³² Decentralised scalable systems offer several advantages, including flexibility, inclusiveness, and reduced susceptibility to groupthink.

Designing response plans: supportive strategies or fantasy docs?

Military organisations are known for their disciplined and doctrinal approach to operations; however, in practice, rigid adherence to such doctrines frequently proves ineffective; crisis plans rarely survive the first contact with the enemy, because they are often overly rigid and based on false assumptions.³³ This was also evident during the COVID-19 pandemic: although every country had prepared detailed playbooks for a pandemic, these plans were seldom followed. This suggests that scalability necessitates clear, but simple routines which include flexibility, rather than exhaustive contingency playbooks, which not only squander valuable time but can also foster a false sense of control and undermine leaders’ discretionary authority. Moreover, it is critical to exercise scenarios on scalability, especially because

scalability requires multi-organisational approaches.³⁴ Table top exercises can be beneficial to identifying and addressing system weaknesses. Ultimately, scalability is not exclusively a governmental concern but a comprehensive responsibility, making it essential to test plans collaboratively with, and within, communities to involve citizens and outsiders to obtain accurate and actionable feedback.³⁵

Specific challenges to scalability

The chapters in this book also discuss a number of specific challenges to scalability, that require further consideration on the part of those politically responsible.

FINANCING WHOLE OF SOCIETY SCALABLE ARMED FORCES

Although the Netherlands has officially embraced the whole of government approach, in fact compartmentalisation prevails. This can be remedied by better coordination, but above all by a shared awareness that security within the whole of society approach is not the exclusive domain of the Ministry of Defence. Although lip-service is being paid to this notion, such an awareness is largely lacking today. Accordingly, most activity under the ‘whole of society’ approach is done with an external enemy in mind that needs to be fought on a battlefield somewhere East. This focus on the armed forces seems to be inspired by the desire to avoid the pressures of full mobilization – quite probably out of fear of an electoral backlash.

In fact, in thinking about security, it appears that the individual ministries are pursuing their own agendas, with party political interests weighing more heavily than the constitutional requirement that government policy be based on policy unity. In military terms, this demand amounts to having an overall strategy, which – as Duyvesteyn and others pointed out in different contexts – today seems fragmented at best. This is highlighted by policies aimed at cutting budgets for education, social work and unemployment benefits, hospital beds and the Safety regions – cutbacks that will actually impair readiness. However, scalability in a whole-of-government approach requires budgetary cohesion, i.e., investment in one sector deemed vital should be accompanied by similar funding in others, or, at the very least, stable funding. Not doing so may in fact be counterproductive in that it weakens structures that are needed to absorb calamities. In fact, several of our authors point to the need to truly establish a whole of government and a whole of society approach to security, which as they argue implies actively strengthening societal resilience. This, in turn, can be a deterrent.³⁶ Truly involving society may not only entail a stepped-up communication strategy or training programs to recognise fake news, but also (and perhaps primarily) requires that government authorities inspire trust.³⁷ The current focus on the MoD and the imbalance in funding can

be explained by the contemporary (and necessary) sense of urgency that is felt to address military and hybrid threats, and by the fact that across government and society security is seen as the MoD's exclusive remit. By contrast, an "all hazard" approach that includes the effects of climate change, might actually be in order as this would actively involve other, non-military parts of society and of government.

ACQUIRING A TRANSFORMATION MINDSET

The Dutch armed forces come from an era of cutbacks and essentially scaling down of the organisation. This era, which started after the end of the Cold War, has impacted several generations of Defence personnel, both military and civilian. Most of these cutbacks were dealt with using the so-called 'cheese-knife method', in which small parts of the organisation were sliced off and decisions to shed off entire weapon systems were avoided as much as possible (the decision to sell all the Dutch tanks being one of the few exceptions). During these decades, the Ministry of Defence has become risk-averse in its business operations and focused on compliance, caused by the profound feeling that every euro could only be spent once. Upscaling the armed forces in preparation for a possible war scenario is severely hampered by this 'peace-time mindset'. The new situation and threat environment requires a transformation, not a 'reversed cheese-knife method', if only because this would take too much time. At the very minimum, the development of scaling abilities for the armed forces calls for a more flexible budgetary process with less departmental and in part self-imposed organisational bureaucracy. Accountability and compliance are important but perhaps not the only way to judge performance or achieve the required scaling effect.

TIMELY DECISION-MAKING

Within scalability, time and temporal dimensions of scalability pose challenges. Prohibitive costs probably argue against standing armies, but the scalable armed forces will equally require time to be fully deployable. In the days of the conscript armies, such mobilisations took several days, but were based on a large reserve of trained manpower and on huge quantities of arms and ammunition that had been stockpiled in peacetime. Scalable armed forces will need to be able to provide similar fighting power but will have to do so from a less advantageous starting point, i.e., arms will have to be bought and personnel will have to be trained in substantial quantities when tensions are already rising. Those that start too late, will find that the costs of new arms are staggering because demand has risen. They will most probably also find that personnel are in short supply and poorly trained. Those that start too soon, however, will face a loss of domestic support because the sense of urgency is not there yet, and run the risk of having obtained weapons that

are becoming obsolete already. Especially in fields with great technological change, this is a considerable risk.

One way to limit the risk of staggering cost or overcome the unavailability of arms is the introduction of a stable resource base; it is proposed that funding is made available regardless of the political mood of the day. Another approach might be to buy the necessary quantities of rare and necessary rare materials. For instance, in the period of the Dutch Republic, the government bought iron ore.³⁸

LEGAL PROVISIONS

A quick glance suggests that in most European states, two different legal systems govern the realms of peace and of war. Since scalability implies the ability to militarise in peacetime (and the other way around), all kinds of laws need to be changed. In the past, armed forces had extensive training grounds, but these have generally been downsized or sold since the end of the Cold War. Scalability would thus also need to include training grounds that can be obtained, or perhaps requisitioned, in peacetime. The same applies to manpower: to give but one example, should regulations on peacetime working hours and working conditions be changed? This is a field that requires considerable attention.

OPERATIONAL CHALLENGES

The above refers to our dominant legal-political conceptualisation of war; if the war has not been declared, it is still peace. Regardless of whether this ever was true, this has dominated Western thinking since the days of Saint-Augustine and as a result, it may be challenging to domestically 'sell' scaling or scalability. Scaling cannot be done in a vacuum; it takes place in response to a perceived threat in the real world. As such, this response will impact real-life dynamics. Domestically, it increases the risks of militarising society, whereas in the international arena it may cause a competitor to believe you actually see the other as an adversary. This is not a new phenomenon; the same dynamic contributed to the start of the First World War, but, as pointed out above, scalable armed forces require peacetime preparation. They also require a proper communication strategy.

Secondly, there is the dilemma of enclosure and disclosure to military information. We noticed military willingness to open up to society, which indicates support for inclusion of societal resources, internalising a *whole-of-society* approach in the Netherlands. But apart from the question of who is to serve whom and how to organise a whole of society approach, the practices of scaling will encounter the real challenges. This is especially the case with military information and access to military locations: the higher the level of protection, the less can be shared with

outsiders – frequently leading to exclusion of societal actors in military exercises. This could be addressed in peacetime by extending clearances to non-MoD personnel. However, the dilemma is mainly situated in the level of urgency; periods of lower threats have less incentives to include outsiders in the military organisations. During emergencies, however, there may not be time, let alone personnel, to devise a smart security procedure.

Thirdly, opinions vary as to how to organise scaling. There are those that argue in favour of fixed structures and recognisable procedures. Others, however, argue that having freedom of action to adapt, change, grow and downsize as the situation dictates, is key. From the preceding chapters it transpires that both courses of action should be pursued simultaneously. Complex processes ought to be addressed horizontally, whereas a top-down approach is suitable for simpler processes. Furthermore, it is the context that dictates the type of capabilities that need scaling. This implies that scaling should not only be thought of in terms of extra numbers. To be sure, this numerical approach – extra personnel, extra ships, tanks, and planes – is a necessity for planning purposes and also from a sustainability perspective. This, however, ignores the extent to which motivation and sense of purpose, but also different ways of organising and flexibility, can act as a force multiplier.³⁹

Fourthly, the military itself needs to become a place of constant innovation. On the one hand, it already is a place of constant innovation, of a willingness to adopt new ideas and new modes of thinking. This has stimulated many promising initiatives such as the Robotic and Autonomous Systems (RAS) project, the data centre of excellence, and the like. On the other hand, however, it is a hierarchical and bureaucratic organisation that has a rather traditional outlook as to how to rise to the occasion and frequently suffers from bureaucratic inertia.⁴⁰ It is eager to learn 'lessons' but at the same time it is eager to forget experiences no longer deemed valid because they do not seem to fit a given scenario. Truly scalable armed forces ought to be able to tap into all kinds of experiences and not merely the latest buzz. In addition, the military tends to justify its cumbersome HRM model by pointing at the past, and tradition: underlining that it is an honour to serve. But perhaps the military should be more open to the creativity and flexibility of society. Although many steps have been taken to retain personnel, there are still thousands of vacancies and the numbers of reservists fall well below expectations. Here too, it may be too simple to argue that society apparently does not see the looming dangers. Perhaps society is indeed risk averse; but perhaps, too, it is Defence that failed to modernise and explain its purpose, something that is perhaps reflected in the tendency to look to the Cold War for guidance instead of looking forward to new emerging challenges.

Against this background, the ethical question that presents itself is whether the mobilisation of society in a whole of society approach implies militarisation

of society, the creation of a garrison state, or greater flexibility on the part of the military? Our chapters argue that it is eminently important to open up to new organisational models and to mavericks who uproot existing modes of operation, create new opportunities for cooperation, exchange and experiment, and strengthen mutual trust rather than strict hierarchical control. We argue in favour of creativity, and decentralisation, but recognise that initially, more direction might be needed. Translated in terms of styles of command, for scaling up to happen we need both mission command and pragmatic approaches. In order to be effective, the armed forces, politicians and society at large need to accept that there will be mishaps, fatal accidents, miscommunications and failures. It is only then that it will be discovered which arrangements are truly promising, and which innovations can be a game-changer. Scalability in military systems is not cheap nor a quick fix, it requires an enormous effort, and it requires an enormous amount of training.⁴¹

Future research

While we believe that these observations may stimulate decision-making, they are only a starting point. Further research is needed in a number of areas. To name but a few, what is actually meant by ‘flexibility’, ‘ready’, and the like? How do these terms work in practice? How do they compete with strategies of action? What provisions are in place to ensure downscaling? Does this mean a return to the status quo ante, or is there a lasting qualitative effect, and if so, how does this influence ordinary peacetime relations? Another set of questions revolves around threat perception, sensemaking, intelligence and bureau political processes. Yet another set would focus on agency, time and scalability: who decides the level of scalability? Of course, the list of topics is longer, but the point we want to make is that scaling requires constant reflection.

Perhaps unsurprisingly, we would first like to call attention to a number of factors that are generally overlooked in discussions about scalability. In the first place, it is pre-eminent that we closely document the decisions that are taken. If there’s anything to learn from past experiences, it can only be done on the basis of documentation.⁴²

Secondly, it is paramount to recognise that scaling up, in a sense, is an interim measure at the moment, necessitated by a shortage in numbers. For instance, the debate on reactivating conscription to increase personnel shows a predominant focus on numbers, means and controlling the process. However, beyond this quantitative way of thinking, we have to think about how we achieve a scalable mindset; it is not all about numbers or resources, not even about technology. Scaling calls for creativity, adaptivity and embracing change in organisations. In other words, the

military must move beyond traditional orthodoxies and outdated beliefs, venturing into uncharted territory. This involves imagining the unimaginable and radically rethinking the fundamental principles that underpin the organization of military readiness. In 1962, US President John Fitzgerald Kennedy spoke the following words to an audience of academics and public figures:

The great enemy of truth is very often not the lie – deliberate, contrived and dishonest – but the myth – persistent, persuasive, and unrealistic. Too often we hold fast to the clichés of our forebears. We subject all facts to a prefabricated set of interpretations. We enjoy the comfort of opinion without the discomfort of thought.⁴³

The chapters in this book mirror our own discomfort of thought, as they identify challenges, question assumptions on scalability, offer food for thought and present recommendations for action. They also aim to present a mirror and offer inspiration. Sometimes they are more exploratory in nature to imagine the unimagined; a starting point to dig deeper on implications for practitioners, society and scholars. As society is warming up to the idea that safeguarding our security requires effort, and, if need be, personal sacrifice, the armed forces, with their Janusian character of speedy decisions and ruthless action in wartime and cumbersome bureaucracy bordering on systemic paralysis in peacetime, will have to scale thinking itself.

Notes

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