Intelligence for a complex environment: transforming traditional intelligence with insights from complexity science and field research on NATO

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9. Conclusion, Reflection, Recommendations

This final chapter consist of three sections. The first section provides the conclusion of this research. The second section serves as a reflection on the research. Finally, the last section suggest recommendations for expanding the complexity-intelligence nexus.

9.1 Conclusion: How can complexity science advance intelligence transformation?

This research aims to contribute to the study of intelligence, not complexity science. Overall it shows how complexity thinking and methods relate to intelligence and how these can help advance its transformation, to adopt to an increasingly complex world.

To this aim, the problem statement *How can complexity science advance intelligence transformation?* is supported by four research questions:

1. *What is the status of intelligence transformation?*
2. *How did the intelligence habitus evolve?*
3. *How does complexity science relate to intelligence*?
4. *How do military intelligence organisations deal with their complex operational environment?*

Before answering the main research question this section starts with a summary of the preceding chapters and their answers to the four research questions.

Chapter 1 sketches the research puzzle: The security environment is increasingly complex, yet intelligence does not incorporate knowledge from complexity science. That provides the problem statement: *How can complexity science advance intelligence transformation?* Intelligence transformation is a fundamental change, a paradigm shift.

Chapter 2 examines the first research question *What is the status of intelligence transformation?* To establish a baseline on intelligence transformation the chapter investigates three focal points of fundamental change: a growing critique on the intelligence cycle model, a diversification of theories, and a debate about a paradigm shift. In the literature these are often described with complexity-related

terminology. The chapter finds that there is an early paradigm shift in so far that there are deep cracks in the traditional paradigm. These cannot be explained with, or incorporated in, existing explanations of intelligence. The increased complexity of the operational environment and security context, studied in a fragmented debate, result in much ambiguity on the form and role of intelligence. Intelligence is in a postmodern condition where different interpretations of intelligence exist simultaneously.

Chapter 3 looks at the second research question *How did the intelligence habitus evolve?* The purpose is to examine how the critique on the intelligence cycle, theoretical diversification, and a possible paradigm shift – including their complexity connotations – relate to broader developments influencing intelligence. It shows how great power politics, technological developments and formative events (external drivers) – as the practical dimensions of the intelligence habitus – constitute increased complexity while the theoretical dimensions of debate and institutionalisation (internal drivers) are lagging behind in response. This also connects back to Chapter 2 and the complexity-related critique on the cycle, intelligence theory, and paradigm debate.

Chapter 4 expands on the intelligence-complexity nexus in answering the third research question *How does complexity science relate to intelligence*? It finds that the nexus between intelligence and complexity is understudied. It identifies Cynefin, the puzzles/mysteries/complexities typology, Jominian and Clausewitzian understandings of intelligence, Rumsfeld matrix, and a β-approach as complexity lenses for intelligence. In addition, the four complexity characteristics self-organisation, emergence, non-linearity, and adaptation are adopted into the research method – as well as the design properties requisite variety, sensemaking, and organisational learning.

Chapter 5 presents the methodology of the case study research into the intelligence organisation of MNC NE. This research uses a qualitative method in a single-case study. It is based on empirical data about how intelligence practitioners comprehend and handle their complex environment. The description of the data initially keeps close to the wording and worldview expressed by the respondents. In a second stage the data is analysed with concepts and ideas from Chapters 2, 3, and 4. These act as a lens to examine the empirical data with.

Chapters 6 to 8 examine the fourth, and last, research question *How do military intelligence organisations deal with their complex operational environment?* After

introducing the intelligence organisation of MNC NE, Chapter 6 describes its environment in the terms used by the respondents: *peacetime, hybrid, or Article 5?*, *exercise mode versus real life*, and *national versus NATO interests*. The chapter finds that the respondents talk about the broader NATO organisation and the operational environment as interconnected and external factors. These are seen as the origin of many challenges that exist within the corps' intelligence organisation. Remarkably, empirical data contained more on problems within NATO than about Russia or other threats. This *'self-imposed complexity'* frustrates much of the intelligence work. Then the analysis of the data on the environment is done using the four complexity characteristics of self-organisation, emergence, non-linearity, and adaptation. The cumulative conclusion of these characteristics is that the respondents experienced moderate environmental complexity. This contrasts with general consensus in professional and academic literature regarding the increased complexity of the military operational environment. Two factors are fundamental in this. First is the tendency to make all problems simple. This is intuitive and by training, as well as enforced because the methods and processes of the intelligence organisation are designed for simple problems. Second, knowledge on complexity, and its methods, was lacking among the respondents.

Chapter 7 describes the organisation of intelligence within MNC NE in respondent terms. This is reflected in the three sections of the chapter: the intelligence cycle, reflections on practice, and issues of alignment. The respondents mainly have problems with the intelligence cycle because it is not functioning as it should do, according to doctrine, within the corps The products and methods form the intelligence practice for observing and measuring of reality, or collection and processing in an intelligence context. Any deficiencies in this are seen as the result of a lack of resources, mandate or otherwise practical circumstances and conditions. With regard to alignment, internally this is primarily frustrated because of the mismatch between force and command structure that in its turn impacts command and control. There is almost no outreach outside of the chain of command to peer units or non-military partners.

Chapter 8 presents the analysis of the intelligence organisation of the corps. In general the respondents are proceduralists and do not think outside the intelligence cycle. It can be seen as a cybernetic feedback loop where only a change of direction input can lead to any adaptation. This is in stark contrast with critical perspectives and academic literature that problematise this traditional understanding of intelligence as a command-driven cycle, applicable in any circumstance and

environment. This forms another dimension in the gap between the practical dimensions of intelligence and intelligence theory.

With regard to theory the overall stance of the respondents is a positivist one and nuances exist few and far between. The larger implication of this is that the military intelligence workforce employs a worldview, and methods, that are increasingly out of touch with the complexity of the practical dimensions of intelligence

When analysing the raw data and earlier conclusions with Cynefin most data points fall in the complex domain. This is in contrast to the intelligence cycle and theory that fall in the ordered domains of clear and complicated. The reason is that most data is about the organisational and operational environment of the intelligence organisation. It is about the problem of complex phenomena within an organisation that is not necessarily suited to deal with complexity. This also underlines earlier conclusions on the gap between an intelligence organisation that is not suited to address the complexity of its environment. The case study confirms the theory from Chapters 2 and 3. The intelligence organisation of MNC NE operates according to schemata that do not fit its organisational and operational environments. The lack of successful co-evolution with its complex environment results in an adaptation failure. This is examined further with the three design properties of requisite variety, sensemaking, and organisational learning. The minimal presence of each property within the corps shows why it is hindered to show more complex behaviour.

The research questions are sufficiently addressed to answer the problem statement. Furthermore, throughout the chapters, two intelligence paradigms appear; a traditional intelligence paradigm for ordered problems and an intelligence paradigm that is tailored towards complex problems. Table 16 juxtaposes both paradigms at the end of this section. While these paradigms are extremes, many in-between modes of intelligence exist.

The traditional paradigm has a worldview that the intelligence environment is knowable and measurable, as long as sufficient resources are available. In this, it is a positivist persuasion. It is also linear, meaning cause and effect are observable. As a result, logical reasoning will usually get a long way, and prediction – to a degree – is possible. Hereby, intelligence problems are seen as puzzles: The problem is finite and an answer or solution exists. It is a sort of formula that needs data, or in other words, a puzzle consisting of puzzle pieces. The more pieces the better, but if one is missing, its meaning can probably be derived from other, surrounding, pieces. The guiding idea is to eliminate uncertainty through effective collection and analysis. More

information and intelligence means more precise assessments. Any remaining uncertainty is the result of a faulty process, not because of the process itself. It is a very Jominian view on intelligence.

The model of traditional intelligence is the intelligence cycle. It is a cybernetic feedback loop that positions intelligence as the feedback from, and to, policy and decision-making. Within this model there are clearly separated and specialist roles within intelligence (stovepipes), and work is mostly done in a standardised way with procedures and protocols to maximise efficiency (the Fordist intelligence factory). The intelligence function itself has little room to adapt the model. The organisation is primarily based on uniformity, diversity is seen as having different functional areas.

The organisation is steered by decision-making, this process is command-led, very planned and deliberate, and problem structuring is often a onetime occasion at the beginning of the operational process. Any adjustments come down to adhering, repairing, or improving to existing processes (single loop learning) while there is little reframing of problems and seeing things in a different way (double loop learning).

The relation between intelligence and policy or decisionmakers is about telling truth to power. Intelligence, ideally, is objective and at a distance from policy or decision-making. In practice this means many intelligence requirements are answered by a one-time, static pull product.

The method, or practice, of this model is geared to find known unknowns. Identified pieces of intelligence that are missing to fulfil the puzzle are broken down to collectable items in an intelligence collection plan. In other words, the intelligence problem is first analysed, or reduced, to understandable and solvable parts. Second, it is put back together again to understand the whole. The analysis happens through logic and analytic techniques, and is mainly done by humans, supported by software. The analysis is either descriptive, explanatory or prognostic and aimed at proving causal connections. Stated differently, it follows scientific logic by reducing the α, the chance of incorrectly concluding a relation between phenomena exists (Type I error, or false positive).

Next to the traditional intelligence paradigm there also appears an intelligence paradigm that is geared towards complex problems. The worldview of this system is postmodern, meaning reality is unknowable, and measurement is mere interpretation. This is because with complexity cause and effect are non-linear, meaning causality is unclear and leads to unexpected major outcomes. Perhaps

causality can be established in hindsight, but beforehand correlation is the best possible outcome. Complex intelligence phenomena are about problem structuring. Because the problem is unclear and changes, structuring the problem requires constant adjustment. Because of this shifting phenomenon, information on it is often contradictory, false, and uncertain. While this is inherent to information to some degree, the problem is significantly worse with regard to complexity. The goal then is to assess the uncertainty, not solve it. Because of inherent uncertainty, single-point predictions are inaccurate and therefore better analysis should point to more possible outcomes (Clausewitzian intelligence).

The model accompanying this complex worldview resembles a complex system itself. It is an open system with explicit feedback loops. This allows it to adapt and incorporate new perspectives, knowledge and collection methods. As the case study research shows this incorporation is severely impaired in traditional intelligence. Ideally, as with the original OODA-loop, the form of intelligence follows its function: The intelligence problem at hand dictates how the model looks like, instead of a single model being the solution to all intelligence problems. The model most allow for collaboration because alleviation of the problem is only possible through improvisation and innovation. In traditional intelligence practice there are too many stovepipes for this to occur.

The organisation is not only diverse in functional areas or collection assets but, more importantly to understand the environment, it is also cognitive diverse. This enables better variety to deal with the environment. The organisation is steered through sensemaking in a collaborative, iterative, and continuous process of problem structuring. Adjustments to the organisation happens through mature double loop learning or to full triple loop adaptation.

This means the relation between intelligence and policy is one of involvement. The relation is close, continuous, and mutually influencing to enable maximum sensemaking of the problem.

Methods in this model look for unknown unknowns. Instead of breaking down the problem and disregarding intelligence that does not fit the chosen analysis path, synthesising all available intelligence is necessary not to miss a threat and discover unknown unknowns. To enable this, and guard against an overload, a data-driven approach is needed in addition to qualitative methods. An example of this is Activity

Based Intelligence (ABI).[614] This method *'uses a large volume of data from a variety of intelligence sources to enable data correlations that, among other things, drive discovery of weak signatures and patterns in a noisy data environment'*. It allows analysts to *'correlate activities, detect anomalies, and discover links between objects'*.[615] This would mean a severe increase in data software and computing power to enable human-machine teaming in intelligence analysis. The ideal is to use foresight and anticipatory methods to identify more possible outcomes instead of narrowing down to a most likely and most dangerous scenario as is staple among military intelligence. To not miss a threat and discover unknown unknowns the model should allow for a β chance (Type 2 error, false negative) approach.

Traditional intelligence paradigm	**Complexity intelligence paradigm**
Worldview	
Positivist (world is knowable).	Postmodern (interpretation).
Linear, causality observable.	Non-linear, correlation at best.
Puzzle solving (problem is finite, solvable).	Problem structuring (problem is unclear, changing).
More information = more precision.	Information is contradictory, false, uncertain.
Jominian intelligence.	Clausewitzian intelligence.
Model	
Cybernetic intelligence cycle.	Adaptive system.

[614] See also: Patrick Biltgen and Stephen Ryan, Activity-Based Intelligence, (Norwood: Artech House, 2015); Lawrence, "Activity-Based Intelligence: Coping with the" Unknown Unknowns" in Complex and Chaotic Environments."; Gregory Treverton, "Creatively Disrupting the Intelligence Paradigm," *ISN Security Watch* (2014).

[615] Chandler P. Atwood, "Activity-Based Intelligence: Revolutionizing Military Intelligence Analysis," *Joint Force Quarterly: JFQ*, no. 77 (2015): 26.

Stovepiped and specialised (Fordist intelligence factory).	Collaborative.
Standardisation.	Improvisation/innovation.
Organisation	
Uniformity, functional diversity.	Requisite variety, cognitive diversity.
Decision-making, command-led, planned, one-time problem structuring.	Sensemaking, collaborative, iterative, continuous problem structuring.
Single & double loop learning.	Double & triple loop learning.
Relation with policy	
Objective, separate (Telling truth).	Involved.
Static pull product for Commander.	Continuous sensemaking.
Method	
Known unknowns (intelligence collection plan).	Unknown unknowns.
Analysis / reductionism.	Synthesis.
Analytic techniques and logical reasoning.	Data-driven (activity-based intelligence).
Processing by humans.	Processing by human-machine teaming.
Descriptive, explanatory, prognostic (forecast).	Foresight, anticipatory.
Reduce α chance, Type 1 error, false positive.	Reduce β chance, Type 2 error, false negative.

Table 16: Traditional versus complexity intelligence paradigms.[616]

[616] Compiled by author.

The answers to the four research questions, combined with Table 16 that contrasts the traditional paradigm with a complexity paradigm, enable to address the problem statement *How can complexity science advance intelligence transformation?*

Complexity science can advance intelligence transformation by providing alternative insights, tested in broader military sciences and other related fields, to improve its performance. This research shows how complexity, first of all, has a lot in common with intelligence. Both fields are concerned with how a system can understand its environment and how it processes information to do so.

The research finds intelligence is failing to adapt to a complex environment. Meanwhile the field has missed the complexity turn, a broader social science adoption of the ideas and methods of complexity science. This research shows how the external drivers, or practical dimensions, of great power politics, technology, and events constitute an increasingly complex world. However, this is not reflected by debate and institutionalisation as internal, theoretical drivers of intelligence. Neither is it reflected by the empirical data. Plotted in Cynefin the data shows an organisation designed for clear and complicated problems, struggling with moderate complex phenomena. This design failure is exemplified by the US Army Field Manual 2.0 *Intelligence* (2023). In the introduction it states: '*Providing effective intelligence is becoming more challenging as operations become more complicated. The current operational environment (OE) is dynamic, complex, and shaped by the intersection of worldwide trends driven by globalization, technology, climate change, shifting geopolitics, and varying stages of conflict and resolution.*'[617] Without realising the writers point out the problem of intelligence, as concluded in this research: conducting complicated operations in a complex environment. This doctrinal publication is a very practical example of missing the complexity turn in intelligence.

Still, several anomalies appear. The critique on the intelligence cycle, the diversification of theory, paradigm issues, and initiatives by respondents that go against traditional intelligence all resonate some form of complexity thinking. In doing so, they form cracks in the traditional intelligence paradigm but it is still far away from any complexity turn.

Complexity science offers a language and understanding to further examine these anomalies – just as it does for examining the gap between a complex environment and an intelligence paradigm meant for solving puzzles. With complexity a new

[617] "Field Manual 2.0 Intelligence," (US Army 2023).

intelligence paradigm is formulated, and contrasted to the traditional intelligence paradigm. The three design properties (requisite variety, sensemaking, and organisational learning) show how concepts from complexity can help to move from the traditional to the new, complexity paradigm.

With these insights this research adds to the debate around the intelligence cycle by explicitly framing it as a cybernetic feedback loop, something that is new even to the latest research on the intelligence cycle.[618] It also adds a voice to a growing volume of post-positivist intelligence theory. This research continues the paradigm debate past the non-state actor turn and formulates a new, complexity paradigm. Another theoretical contribution is the development of intelligence in the framework of Buzan and Hansen, that links intelligence studies to related fields such as security studies and international relations. More theoretical contribution is made by comparing intelligence to broader military science and the study of war and warfare. This research makes a contributions to research practice; it shows the role of military security and secrecy in scientific fieldwork, something which is rarely addressed in a practical manner.[619] Lastly, this research provides some insight into NATO – which is very relevant considering the developments on the alliance's eastern border.

9.2 Reflection

This section on reflection consists of three parts: theoretical, methodological, and personal. Regarding theory, while the nexus on intelligence and complexity in literature is small in volume, this research shows the usefulness and value of using complexity science to examine intelligence. It showed how intelligence missed the complexity turn in social sciences while there is a general agreement that the modern operational environment is complex. It also showed how characteristics and design properties of complexity shed new light, and offer novel solutions, on intelligence problems. Especially the Cynefin framework enables an application of complexity thinking to organisational problems. Besides the intelligence-complexity

[618] Daniel Tallat Rønn Shakoor, "The Intelligence Cycle in Denmark: Unwinding and Reconceptualising the Process of Formulating Intelligence Requirements Surrounding the Middle East in the Danish Defence Intelligence Service" (University of Southern Denmark, 2021).

[619] Sjøgren et al., "Military Security and Research Ethics: Using Principles of Research Ethics to Navigate Military Security Dilemmas," 36.

nexus this research connects theory from security studies, international relations, and broader military sciences.

The most striking theoretical feature of this research is the contradictory need for intelligence organisations to simultaneously be centralised to coordinate all different functionalities, and be decentralised to quickly adapt to emergent issues. This is based on Rovner and Long in section 3.6.2, and emphasised by De Waard et al. in section 4.1.1.[620] This poses a conundrum without an ideal solution, and calls for attention towards the study of the adaptation mechanisms of intelligence systems.

In general, when regarding the role of theory in this research, it was expected the abstraction level of complexity would take some heavy conceptual struggling before it could be sufficiently mastered to apply it to intelligence. While it was by no means easy, in the end, this was not the case. While there is no shortage on abstract, theoretical publications, the literature on complexity also has authors that connect to real world issues in accessible language.[621] Especially Cynefin showed value in understanding complexity, and even more so in analysing the empirical data. Other inroads into complexity were found in broader military science literature, that showed how complexity was adopted into (the study) warfare. This literature, by nature, is closely related to intelligence studies.

The last theoretical reflection is on the Western intelligence system as mentioned in Chapter 5. There it states that the intelligence system under examination in this research can be seen as being valid for all Western, and NATO states. This is based on a unifying effect of shared, or comparable, doctrine within NATO but with more Western partners as well. This in turn is a manifestation of a general desire for military interoperability among Western partners given the international missions of the last decades. This does not mean this Western intelligence system is normative, or exactly the same everywhere. Within the term Western is a variety of intelligence cultures with different histories, threat perceptions, and ideas on intelligence.[622]

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[620] Rovner and Long, "The Perils of Shallow Theory: Intelligence Reform and the 9/11 Commission," 627; de Waard et al., "Learning in Complex Public Systems: The Case of Minusma's Intelligence Organization."

[621] e.g. Johnson, *Simply Complexity: A Clear Guide to Complexity Theory*; Mitchell, *Complexity: A Guided Tour*; S Page, *The Diversity Bonus* (Princeton: Princeton University Press, 2017).

[622] e.g. Bob de Graaff, James M. Nyce, and Chelsea Locke, eds., *Handbook of European Intelligence Cultures* (Lanham, MD: Rowman & Littlefield, 2016).

There is however enough common ground found regarding the topics examined in this research to call it a Western intelligence system.

When reflecting on the research method, two issues stand out. The first one is the interplay between the empirical data and its analysis. Because the interviews were semi-structured, and the goal was to stay close to the worldview of the respondents, the planned analysis process had to be adjusted as the interviews progressed to fit the analysis to the data instead of vice versa. Initially, the Cynefin framework was used to operationalise questions. Specifically, the type of constraint, practice and action per domain of the framework were transformed into questions regarding the intelligence environment. However, this proved too abstract for the first few respondents. It required too much immediate reflection and thinking on their part. Therefore the adjustment was made to use the idea of a paradigm for the analysis of the interview data and Cynefin was used to draw inferences from.

Another interplay between data and analysis concerns the alignment terms from Chapter 7 and the design properties that followed from it in Chapters 8 and 9. Initially the idea was that any topics on the coordination of intelligence effort and exchange of intelligence products would fit in the original question set. However, the volume of data on alignment issues called for a section of its own. This realisation, after the first round of data collection, led to the decision to make the alignment issues explicit and specific. This meant formulating extra theory to operationalise questions from and to analyse the data with.

The second methodological issue that stands out is the role of secrecy in doing research into intelligence practice. As described in section 5.2.1, secrecy permeates the entire research. It plays a role in getting access, the possibility of research topics, and storing data. Not mentioned in section 5.2.1, and attesting to the professionalism of the corps' intelligence organisation, is that during the field visits the research team was approached by counter-intelligence officers on two occasions. In a conversation these officers merely wanted to double-check on research agreements made by others for which they were responsible in case of any security issues. Another safeguard was a review by several officers of the corps headquarters. Not only does secrecy limit research opportunities, measures to safeguard it can be time consuming.

These methodological issues lead to the significant question how the case study research method influenced the overall research results, which in turn ties in with issues of validity regarding a single case study (see section 5.2.4). First, the first four

theoretical chapters were written before any serious in-depth exploration of a specific case study. In this sense, as well as the amount of chapters, there is balance. In volume, the theoretical chapters even take up two third of the total wordcount. Second, the conclusion of the case study confirmed the theoretical conclusions to a large degree. Third, the semi-structured form of the interviews, as well as the Gioia method, provide enough space for the respondents to communicate their worldview in their own words, without the data leading to a constant re-evaluation of the theory preceding it. Fourth, the research can be repeated on a different unit of analysis, be it a national intelligence service, deployed military intelligence unit, or private sector intelligence. There is no requirement to change the research method or to delete any case study specific elements in it.

Furthermore, the validity of the research was tested on multiple occasions. The theoretical and case study parts of the research have been presented, separately, and in combination, at (scientific) conferences, in professional military education, and on working floor level. A driving force was the yearly International Studies Association conference. This led to contact and ideas with scholars and ultimately to three publications that tested some of the research conclusions.[623] Regarding education, the research results are integrated into lectures that are part of the curriculum of military cadets, analysts of both Dutch civilian and military intelligence services, and military intelligence officers in the Dutch Armed Forces. On occasion lectures were given at e.g. the Dutch Army headquarters staff, Dutch Special Operations Command, Royal Military College Saint-Jean (Canada), and Mercyhurst University (United States). All these occasions provided the opportunity to get feedback on research insights and results. The lectures were not only a transfer of knowledge, but on several instances led to the adoption of complexity insights and applications. Anecdotally, after a lecture, the commanding colonel of a project team to review the Dutch military intelligence system vowed to *'embrace uncertainty'* in thinking about a renewed system.

[623] Spoor, "Intelligence Adaptation; Insights from Complexity Science and the Need for Analytic Cognitive Diversity." in "Innovations in International Affairs" book series volume, edited by Effie Charalampaki, Czesław Mesjasz and Luis Tomé (Routledge 2025), forthcoming; Spoor and de Werd, "Complexity in Military Intelligence."; Spoor and Rothman, "On the Critical Utility of Complexity Theory in Intelligence Studies."

The last reflection is on the role of the researcher. Being a soldier with experience in intelligence is an integral aspect of this research. Anecdotally, when the researcher was confronted with the scientific term 'unit of analysis' the connotation of 'unit' and 'analysis' was purely military. Also, the term 'informant', that in many research literature is used to mean people to be interviewed by the researcher, had a different connotation entirely. To avoid any conflation with the term being used in matters regarding covert human intelligence sources this research prefers the term 'respondent' instead.

Being an insider of some sorts influenced the conduct of the case study research with regard to getting access and gaining the trust of the respondents, as described in section 5.2.1. Being a soldier with intelligence experience also had challenges. When communicating about, and writing on, the research many intelligence content had to be explained without using too much terminology and insider-speak. For a field that exists largely outside the public eye, and that is rife with abbreviations and acronyms, this was a trying process. Another challenge was when respondents started sharing stories that could be classified, or sensitive otherwise. This meant the ethical restriction on the side of the researcher not to record or use this data.

Still, being a soldier still meant being surprised when finding out a lot of foundational concepts of modern day warfare are based on complexity thinking. This is never addressed during personal professional military education. It provided conceptual linkages that helped to understand complexity and how to apply it to intelligence. This is exemplary for how the research left the familiar terrain of intelligence practice and an international relations master and transitioned into unfamiliar terrain such as, next to complexity science and military sciences, security studies, postmodern philosophy, and organisation theory. This meant both a broadening of perspective and a sharpening of understanding each individual field.

9.3 Recommendations

This section first provides recommendations for the intelligence organisation of MNC NE. Several of those will resonate with general intelligence challenges from broader practice; NATO-wide, national intelligence services, and military units and commands. Second, the section suggests recommendations for further research.

9.3.1 Recommendations for practice

Overall, the respondents are unanimous in concluding that NATO's internal organisational dynamics exacerbate the problem. Particularly the notion that many military issues are interconnected with politics and national interests complicates performance within NATO structures. However, in order to make the outcome of the present study actionable, the recommendations will focus on areas of interest that can actually be influenced by NATO and/or MNC NE on a military level. Therefore, the recommendations will not debate NATO's peacetime mandate and organisational characteristics because these are given political facts. However, it must be stated that, to some degree, these things cannot be separated. The hybridity that Russia employs against NATO and its member states is designed to exploit the current situation without escalating to a level of more direct and open (military) confrontation.

It is important to emphasise that at the military level the issues brought forward in the interviews are interconnected as well. For example, without a prominent role for agreed upon intelligence requirements, current events tend to get most attention, making intelligence collection prone to emergence. Consequently, a self-enforcing collection cycle develops wherein current affairs and open source reporting start dominating the intelligence products. On top of that, the corps has no dedicated capacity to produce usable OSINT. As a result, there is the danger of becoming too reliant on non-validated open source information for decision-making, but also the contamination of key data bases with large volumes of doubtful raw information. Consequently, issues like circular reporting and insufficient source grading pervasively infect the outcome of the intelligence process.

Due to the interconnectedness of factors influencing the intelligence process, the recommendations for the intelligence organisation of MNC NE are divided in two parts. First, referring to requisite variety, organisational learning, and sensemaking as key design properties of complex systems, a comprehensive, yet more fundamental, view on the functioning of MNC NE will be provided. These design properties are operationalised using the case study, but they show how intelligence organisations of all kinds can benefit from insights from complexity science.[624] Second, more practical and easier to address suggestions for improvement will be given for intervening at specific points in the institutional context, and the intelligence cycle and its issues of alignment.

[624] See also: Rietjens, "The Future of NLD DISS: A Complex Perspective."

First, the principle of requisite variety requires attention. Within MNC NE a dual picture emerges. On the one hand, the multi-national composition of the corps creates a base of human resources that is culturally quite diverse, where staff with different historical and societal backgrounds work closely together and share knowledge. On the other hand, the corps' rather traditional deterrence role within the overarching military strategy of NATO has placed the performance focus on manoeuvre warfare. As a result, cognitively the staff is far less diverse. Apart from military knowledge on major combat scenarios, insights and skills are needed to identify and interpret security conundrums that remain below the threshold of war. However, required expertise in for example social media dynamics, cyber tactics, public order, and security challenges, but also in languages, religions, and global micro-regions, is so diverse that structural incorporation within MNC NE seems impossible. Still, it is recommendable to invest in better managing the diversity that is already in place, but also in ways and networks to consciously attract specialised non-military knowledge when needed. Regarding the former, increasing cognitive diversity and/or better managing existing diversity is a recommendation for intelligence in general; NATO-wide, national intelligence services, and military units and commands. Regarding the latter, one could think of creating liaison positions to set up and maintain external relations and establishing formalised relationships with NATO centres of excellence, military academies, and civilian knowledge institutions (e.g. think tanks and universities).

The second property entails the trinity of single, double, and triple-loop learning. It could be argued that within MNC NE single loop learning dominates. However, this learning ability appears local and informal, mainly taking place at the individual and team level without codifying the learning experiences for others to take advantage of. MNC NE's ability for double loop learning (i.e. changing goals or decision-making frames based on experiences) is strained because the formal military deterrence role it has to fulfil does not comply with the equivocal hybrid and grey zone threats the corps is currently facing. Triple loop learning is about actors linking together in a learning structure that generates new frames, methods and processes. The study identifies OSINT as the centre of gravity for fuelling triple loop learning, that as second order effect could help to improve the double loop learning process. In short, if the collection, analysis, and dissemination of open source information is professionalised, relevant societal knowledge impulses can be fed into the ruling military-focused intelligence process, making it possible to combine a military combat focus with a threat assessment of environmental dynamics taking place below the threshold of war. There is however a significant legal issue with regards to

OSINT mandate for military and intelligence organisations in peace-time conditions. This, again, points to problems being interwoven between political and military levels and without sufficient mediation of the issues will continue the usefulness of OSINT and be a handicap for intelligence in the information age.

One level of learning lower, a professionalised OSINT process supports the mitigation of circular reporting and source grading. A low hanging fruit solution for improving OSINT is to start with providing better OSINT training before people actually start working in the J2 branch. A more fundamental consideration is, of course, how to professionalise the entire OSINT process. It evokes additional questions like: What kind of and how many subject matter experts do we need? Do we need in-house staff or can we attract the required specialists trough networking? How do we establish an ample human resource base to safeguard sustainable staffing of OSINT positions?

Sensemaking is about the ability the continuously re-evaluate situational awareness. Currently, within MNC-NE, sensemaking is problematic, because pressing deadlines, daily routines, formalised processes, and personnel shortage, leave hardly any room for people to contemplate and have discussions with colleagues from other J2 sections or MNC NE branches. An important recommendation is, thus, to set-up new or improve existing consultation committees specifically aimed at facilitating the exchange of knowledge and learning experiences between people. Institutionalising the potential of workers to actively and mutually scrutinise existing modus operandi could help to create an atmosphere of continuous improvement.

A second issue that affects sensemaking concerns the disconnect between the functioning of MNC NE during exercises and under regular conditions. The two enactment realities seem to alternate, which causes feelings of confusion among staff. Especially, after Russia had invaded Ukraine the traditional distinction between the two worlds was deemed artificial and even out of place. The fact that most exercises followed a traditional manoeuvre scenario, particularly in comparison to the intricate mixture of overt and covert hostilities actually taking place in Ukraine, further increased these feelings. Respondents stressed repeatedly that the staff does not live up to the key military paradigm of 'train as you fight', disqualifying the enactment logic and patterns of exercises for being obsolete.

Interestingly, however, at the same time many respondents hailed the exercise mode for making it possible to break out of daily routines and transcend ruling stovepiped work relationships. When an exercise had ended people missed the

mutual adjustment dynamics that organically took place during exercises. Knowing that MNC NE has already scaled down its contributions to exercises not directly benefitting its mission, the present study shows that investing even more effort in bringing the two worlds closer together could offer major performance gains. Developing realistic scenarios and preparing the corps in different exercises for a variety of task settings is one of the most promising measures to take. For intelligence units especially, the closer the scenario is to reality, the better it can be trained for the hybrid complexities of today. After all, when the depth, richness, and vastness of real-life information clouds are captured in scenarios, intel specialists are actively challenged to dissect such conundrums into viable and military relevant intelligence products. Another, perhaps more difficult path to travel, is to try and mimic the behavioural interaction patterns of exercises in the regular working routines of MNC-NE.

Next to these suggestions based on design properties, the following four practical avenues for improvement are suggested. First, the IRM&CM functionality needs a revival to improve the horizontal and vertical alignment of the intelligence process. Deliberately managing the operationalisation of intelligence requirements could offer a shared intelligence mind-set that facilitates cooperation between the different J2 sections and that synchronises the key echelons in the intelligence chain. In addition, an initial quick win would be to use the doctrinal terms of 'planned' and 'emerging' intelligence requirements to differentiate between the requirements from the Intelligence Collection Plan and those derived from current events. This helps to manage and balance effort and resources. To some degree at least, as emergent issues are inescapable in a complex world. Furthermore, the perspective of the analysts also determines if something is considered emergent or not.

Second, two intel collection issues need consideration. To start with, making collection requirements explicit could help to streamline demand-supply relationships within the intelligence chain, also improving internal accountability. Next, the use and knowledge of relevant databases varies considerably between the individual respondents. Preparatory training could easily address this problem.

Third, concentrating on intelligence processing, the problems with transforming open source information into relevant and reliable intelligence stand out most. Apart from the fundamental changes discussed earlier, a more concrete improvement would be to provide training in structured analytic techniques. This would offer analysts a proven and standardised method of working.

Fourth, dissemination appears to be push-oriented with MNC NE's commander as the sole consumer. A revived IRM&CM framework could guide the dissemination of intelligence to a broader audience and familiarise other sections with the existing portfolio of intelligence products.

9.3.2 Recommendations for further research

This last part of this section, and research, suggests recommendations for further research. The obvious recommendation is to call for more research on the intelligence-complexity nexus. As this research shows, applications of complexity science to intelligence are sparse. This research aims to address this but can only scratch the surface. Because complexity science offers a broad research agenda for intelligence, future research could elaborate on many things from applying computational methods to literature on planning and management in complexity, and from spatial/geographic complexity to complexity in political science. This call for more research on the nexus is directed towards intelligence, and complexity related fields and disciplines from outside the intelligence sphere.

A pertinent issue for more complexity research into intelligence, as mentioned in the section on reflection, is the issue of design. How to create an organisation that is suited to the task at hand but at the same time is quick to adapt to any new circumstances? This research does not mean to portray traditional intelligence as simple or easy, it is still difficult. More important, it is still relevant – only not for all intelligence problems. However, it is not about one system being better than the other, it is about using the right one for the problem at hand. It is about adaptation to changing circumstances. In reality, both traditional and complexity intelligence systems would be the extremes and the intelligence problems distributed along ranges between these extremes. Not all intelligence problems are either clear or complex. Furthermore clear problems can have complex aspects, and vice versa. Another interesting thought is offered by De Werd who states *'the problem typology of puzzles, mysteries and complexities should be seen more as a matryoshka doll: puzzles are workable simplifications but never excuse analysts from reflexivism'*.[625] This brings us back to the question how an organisation can be designed to adapt between both intelligence paradigms.

Getting perspectives on how this adaptation can look like, are helpful in designing other intelligence systems. A starting point can be derived from Hammond's article

[625] Peter de Werd, "Reflexive Intelligence and Converging Knowledge Regimes," *Intelligence and National Security* 36, no. 4 (2021): 513.

'Intelligence Organizations and the Organization of Intelligence'.[626] In his article Hammond shows that Cold War intelligence saw discussions on how to organise along two contradictions. The first contradiction is the need for centralised command to coordinate the many aspects of intelligence versus the need for decentralisation to be more adaptable for complex situations. The second contradiction is if intelligence should be organised geographically or thematically? However, Hammond also concludes that during these Cold War discussions no scholar *'provided a method for determining the circumstances in which one structural design might be better than another'*.[627]

Another possible starting point is Volberda's idea of organisational flexibility.[628] This is a two-dimensional concept. It is about a managerial task, or control capacity, on one side. The other side is about the organisational design task, or the controllability of the organisation. Both tasks need to be fit for the environment. The managerial task is to know how to harness which capabilities of the organisation sufficiently to deal with changes in the environment, called the 'sufficiency of flexibility mix'. In addition Volberda states an organisation needs to actively study this sufficiency of flexibility to learn from it. The design task is to realise an organisation that is responsive to the flexibility mix. The organisation should create conditions that foster flexibility, called 'adequacy of organizational design'.[629] While there is no room here to go into details, both Hammond and Volberda offer promising concepts to examine how intelligence adaptation can look like.

Other recommendations for further research concern the intelligence cycle. The cycle in the traditional intelligence system is intended for major combat operations, but as the case study shows, has severe shortcomings in a hybrid context. This brings up the question if, and when, and what shortcomings manifest? Research into the boundaries of the cycle – when is it (no longer) useful? – as well as the search for an

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[626] Hammond, "Intelligence Organizations and the Organization of Intelligence."

[627] Ibid., 703.

[628] Henk W Volberda, "Toward the Flexible Form: How to Remain Vital in Hypercompetitive Environments," *Organization science* 7, no. 4 (1996); Henk W. Volberda, *The Flexible Firm. How to Remain Competitive* (Oxford: Oxford University Press, 1998).

[629] See also: Amaia Sopelana, Martin Kunc, and Olga Rivera Hernáez, "Organizational Flexibility: A Dynamic Evaluation of Volberda's Theory" (paper presented at the 28th International Conference of the System Dynamics Society, 2010).

alternative (model) are much needed in stimulating a critical reflection on the archetypical model of intelligence.

Expanding non-positivist intelligence theory, and further defining intelligence paradigms is a recommendation to stimulate scholarly reflection as well as the theoretical development of intelligence. On top of that, well thought-out paradigm formulations, offer insights for changing intelligence practice.

Lastly, research on NATO intelligence is encouraged, as well as empirical research into how different intelligence organisations, make sense of their complex environment. It would be especially interesting to examine intelligence organisations outside the western space.