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What is a Domain?

Understanding the domain term in Multi Domain Operations

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Preface

In working with this thesis, I have come to experience a near stereotypical rollercoaster of drive and engagement with the work. From moments where everything flows seemingly effortlessly to those where no progress can be made, it has been an interesting journey. It is also a journey I could not have conducted without the support of several key people. On the home front, my wife and two daughters have put up with a more or less constantly distracted father. At the same time, my colleagues and superiors have had to deal with a persistent conflict between the demands of writing and the demands of work. So, a huge thank you to all of you, I could not have made this thing work without your support and understanding.

This has allowed me to dive into the realm of obscure theory and convoluted meanings, which I have thoroughly enjoyed. There is something to the process of trying to wring a myriad of interpretations out of a single phrase or term that I have found deeply satisfying. As guides on this journey, my two academic supervisors have been indispensable, both in providing sparring and necessary guidance and correction. This has enriched the academic journey and, I hope, helped in creating a thesis that you as a reader will find useful or at the very least interesting.

With that, I will only wish you a pleasant and interesting read and hope that you can find at least some of the pleasure I have found in the creation of this thesis evident in the final product.

Executive Summary

There is an ongoing debate as to carry out Multi-Domain Operations and how to best prepare your force for it and implement the concept. However, neither the domain term itself, nor MDO as a resulting construct is unitarily understood among the participants in the debate.

To contribute to this debate, this thesis poses the following three research questions.

1. How is the term Domain understood in the current MDO debate?
   a. What, if any variation has there been in the understanding of the Domain concept since MDO was launched as a concept in 2016/17?
2. Is there a correlation in the understanding of the Domain term and the understanding of the MDO concept? Is there a causal link between the understanding of the term and the understanding of the concept? If so, what is the dependent and what is the independent variable?
3. How can these relations, and their attendant understandings of MDO, affect small and medium states, with Norway as an example?

By conducting a literary review of openly available government publications, primarily from the US, UK, NATO, and Norway, combined with different articles and contributions to the debate, a picture of the various interpretations and their implications can be painted.

It is quickly apparent that the domain term is far from unitary in its understanding, but the origins and implications of the various interpretations are less clear. In addition, the variation does not appear to follow any set geographical, organisational, or chronological lines within the timeframe addressed, primarily from 2016 up until today.

Furthermore, variations in the understanding or usage of the domain term appears to correlate with the understanding of MDO. However, the direction of a possible causal link, or if both are dependent on another variable cannot be ascertained with any degree of confidence from the available source material. This would seem to indicate that there may be several different relationships between the variables, depending on the writer in question.

Based on this apparently fractured understanding of both the domain term and MDO as a concept, navigating the security environment becomes challenging for small states such as Norway. This is primarily because the various interpretations lead to significantly different adaptations of one's posture and policy, with several of the adaptations having the potential of being mutually exclusive.

In total this shows that the apparent lack of a common understanding of the terms and concepts discussed in this debate contributes to potential misunderstandings in aligning both force structure, doctrine, and general security policy. Given the potential cost associated with investing in the "wrong" structure or approach, this ambiguity is especially troubling for smaller states such as Norway with

relatively limited capacity to pursue multiple tracks of development and force structure. However, given the varying points of view and perspectives involved, a unitary understanding of the term and the concept is unlikely. It is therefore imperative that one is mindful of the perspectives of the various participants when trying to make sense of the debate.

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1. Introduction

There is currently an ongoing debate about how NATO in general, and European powers of various sizes in particular, should relate to the concept of Multi Domain Operations (MDO) and its myriad incarnations. In addition, there seem to be a lively debate about what the concept entails for both technology and organisation. This debate mirrors an ongoing debate within the US armed forces with regards to how the force shall succeed in the future.

The outcome of this debate is of great interest, especially to smaller militaries, that within any probable budget will be unable to maintain a full spectrum of military capabilities with a meaningful volume. How should one set up a relevant armed force for integration with the alliance senior partner without a clear understanding about what their concept and structure is going to look like?

As of the writing of this thesis, the last development from NATO, was the July 2022 issuing of an Initial Alliance Concept for Multi-Domain Operations (NATO, 2022). Publishing this concept has not put the debate to rest, as the concept is not a final product, but rather a steppingstone for further development. Furthermore, the initial concept also explicitly states that the definition of MDO given by the concept must be handed over to the NATO Standardisation Office for further processing, while the concept guides the Alliances long term adaptation (NATO, 2022).

However, the focal point of this thesis will not primarily lay with finding one or many definitions of MDO. Beneath the discourse concerning the nature of MDO, there appears to be diverging definitions or understandings of what makes up a domain. This might seem like a minor point but given the amount of debate about how to understand MDO, the added layer of uncertainty regarding the domain term could be decisive. Since it could have significant implications for the outer boundaries or reach of MDO as a phenomenon, the understanding of the domain term warrants investigation.

As stated by Donnelly and Farley in their 2018 article, (J. Donnelly & Farley, 2018) there appears to exist a form of consensus that the battlespace consists of and/or is affected by a myriad of domains.(Concepts and Doctrine Centre Developments, 2016 p.18-25, 2020 p.17-21) What makes up these domains and how they are bounded and interact is more open for debate.

This then can become an ontological question along the lines of does a domain in fact exist, and if it exists, what properties define it? The implications of such a question are perhaps not merely philosophical. How we understand the components and artefacts used to construct a concept, could have a significant impact on the larger concept.

Following through on these implications, one might end up contemplating the question of what makes up a Domain from several different perspectives. As stated by Nyeng, the answer to such a question is influenced by several factors, all depending on how one frames the question, and how one then relates to the values used as both inputs and to describe outputs.(Nyeng, 2012 p.17-23) If one then accepts that the attributes of a domain influences what shape a concept like MDO that uses the domain term takes, it becomes interesting to study the domain term itself as a foundation to contribute to understanding of the MDO concept.

Based on this, the following three-step research problem will be put forward for this thesis.

- How is the term Domain understood in the current MDO debate?
  - What, if any variation has there been in the understanding of the Domain concept since MDO was launched as a concept in 2016/17?
- Is there a correlation in the understanding of the Domain term and the understanding of the MDO concept? Is there a causal link between the understanding of the term and the understanding of the concept? If so, what is the dependent and what is the independent variable?
- How can these relations, and their attendant understandings of MDO, affect small and medium states, with Norway as an example?

The aim of these problems is not to find a "correct" understanding of the domain term or an "ideal" approach to MDO, but rather contribute to an understanding of the concepts underpinning the debate. An improved understanding of the components making up the concept in question can reduce the level of potential misunderstanding in the debate. Furthermore, it can provide a more uniform and informed foundation for the debate.

In addition, a potential drift in the use and understanding of the Domain term, either temporal, organisational or geographic, in discussing MDO since the launch of the concept (*Multi-domain battle: evolution of combined arms for the 21st century, 2025-2040*, 2017), could lead to misreading of literature from different perspectives. This could be an issue even within the relative short timeframe in question here. In this regard, exploring the research problems could contribute to the current debate by investigating if the understanding is evolving, and if so, in what direction and to what degree.

Furthermore, an increased understanding of how the domain term is, understood, and by extension how the concept of MDO is constructed can potentially contribute to the ongoing debate about MDO as something brand new versus a natural evolution of the Joint operations mindset. This in turn can improve the foundation of the ongoing structural debate.

In line with this, the target audience for this thesis is primarily master students and others interested in military theory and conceptual understanding. Since the aim is not to be prescriptive but rather

descriptive with regards to the phenomenon studied, the thesis aims more to provide an additional frame of reference rather than a definitive guide on how to understand or implement.

This is also related to my personal motivation for producing this thesis. During my studies at the Defence University College, I was struck by the way terms and concepts were used in discussion as if they were understood in a monolithic and unitary way. At the same time, these mental constructs were being used to advance several different and divergent lines of reasoning. Trying to chart the spectrum of a few of these variations appeared a worthwhile endeavour, hence this thesis focused on the understanding of the Domain term in the framework of the MDO debate as outlined earlier.

2. Methodology

Investigating an abstract phenomenon like a term or definition brings up certain challenges. How can an observation of something not physically measurable be recorded and analysed in a way that would be possible to reproduce or follow the reasoning of with a different theoretical standpoint and different perspective? To a large extent, my observations will be shaped by my previous knowledge of the field, and my expectations regarding that which I might find. This is a well know phenomenon in research, but it still important to bear in mind, that whatever empirical evidence or data I find and use in my reasoning, it only exists in its current form due to my particular set of references as a researcher (Nyeng, 2012, p.25-26).

Furthermore, the design and conduct of research can, as described by Busch, be viewed as a layered process, where one starts with the outer layer and works inward (Busch, 2021 p.48-49). In keeping with this approach, the description of the thesis methodology will be made stage by stage, while also making note of pros and cons of the chosen perspective or technical approach.

The first clarification required is with regards to the position of this thesis on the nature of knowledge, or scientific philosophy. As is common within the social sciences (Nyeng, 2012 p.37-39), the epistemological position of this thesis is that the phenomenon to be investigated is inextricably linked to the perception of both the participant and the researcher. That implies that any knowledge uncovered or created within the framework of this thesis will be a subjective product of several layers of perception.

Operating with this set of assumptions, the choice of epistemological position and research design becomes something of a philosophical exercise (*Into the Research-verse*, 2022). This strengthens the thesis in that it makes it possible to include several, seemingly contradictory data points, if they can be reconciled via their respective perspective of origin. However, a drawback of this point of view is that according to the same logic, no absolute truth can be established, and all findings derived from an investigation will be contextual to some extent. This is not to say that such a position equals cynical relativism (Nyeng, 2012 p.37-41), since it still acknowledges that a position can be established that accounts for a larger number of factors and can explain more phenomenon to the satisfaction of more perspectives. Such a position may still be regarded as carrying more weight even though falling short of a definitive factual description of the world.

2.1. Research design

Based on these considerations, a choice of research design can be made to give any findings as much weight and validity as possible. In choosing a philosophical position stating that no completely quantitative data can be assembled, it is now possible to discard several types of research designs as

impractical or unsuited for the problem at hand. Choosing a position favouring contextual data varying with perspective, any primarily quantitative study would seem illogical. However, this is not entirely the case. Several studies within the social sciences, typically associated with a similar viewpoint have been conducted using statistical methods, where a set of quantitative values are used to depict one or more complex social phenomenon. In the case of this thesis, a design based on a questionnaire regarding the respondent's views concerning one or more of the research questions could potentially yield valuable data by way of making an abstract phenomenon available for statistical analysis and interpretation.

A statistical analysis of such data could possibly answer research questions related to how the MDO concept and the domain term is understood among practitioners. On the other hand, the access to respondents would probably be limited in large to Norwegian practitioners, thus limiting the thesis to a Norwegian context, at least within the timeframe available for this thesis. This limitation can make it impractical to generalize findings or lead to false positives if the Norwegian context should prove to be too distinct. Based on this, a questionnaire- or interview-based design is discarded, and the choice of possible designs narrowed.

Further considerations to be made in arriving at a choice include the choice between an extensive or intensive design, and defining the timeframe to be investigated.(Busch, 2021 p.52-56) In answering these questions a series of compromises between several considerations must be made, as any choice to strengthen one aspect of the thesis, will incur a cost in another respect.

Given the phrasing of the research questions for this thesis, which deals with various understandings of a term and its related implications on a concept, it can be argued that it is logical to opt for an intensive design (Busch, 2021 p.52-53). This would strengthen the thesis in its ability to describe and analyse the nuances in an understanding. On the other hand, this focus will limit the number of sources that can be investigated, thus increasing the potential of distortion of the data by a single or a few sources. In addition, an in-depth look at a small number of sources requires a more extensive analysis by the researcher, thus increasing the possible impact of the investigator upon the data. In sum however, given the complexity of the research questions and in combination with the above-mentioned availability of sources, an intensive approach would appear to be the best choice. Using this approach, the possible faults mentioned above must be considered when extrapolating data and formulating conclusions.

Both the initial philosophical stance staked out for this thesis and the practical considerations with regards to the use of questionnaires or interviews, a literature based qualitative approach becomes the preferred design. None the less, using a qualitative approach to investigate and describe a complex

phenomenon has some disadvantages. The level of subjective interpretation required to analyse qualitative data is higher than that required in a quantitative investigation, at last once the operationalisation has been conducted. This increases the possible effect of the investigators biases, preconceptions and thought patterns on the available data. Taken together with the similar disadvantages connected in general to an intensive approach, this can be a significant source of distortion of both data and conclusions. On the other hand, in investigating complex possible correlations or covariations, a high degree of subjective interpretation would be required to assign numerical values to the variables investigated. Based on this, the thesis will use a qualitative approach, as both methods are affected by similar challenges with regards to interpretation, and a qualitative approach would then be closer to the form of the original data. Furthermore, the conclusions can be presented without need of the intermediate steps associated with encoding and then interpreting statistics.

2.2. Timeframe of the data

With regards to the timeframe of the data collected and included in the research one obvious approach would be to limit this to the timeframe from the launch of a TRADOC white paper in 2017, launching the term MDB and up to the present day. However, using this as a starting point would omit the introduction of the domain term in military literature with several consequences. Using this limit might exclude insights into the process launching and integrating the domain term into military discourse that might have implications for how the term is understood and used. These considerations make it necessary to use a longitudinal approach to the data collection, gathering information from various times, and in some cases revisiting a single source at several points in time.

This is particularly true for data concerning the Domain term as its usage in military discourse predates the MDO concept by more than a decade (Heftye, 2017). The obvious advantage of this is the possibility of seeing development or alteration in the data over time, thus revealing one or more possible trends. On the other hand, collecting data from a selection of sources at various point in time might not sufficiently account for possible changes in the context surrounding the data. All data produced by humans in interaction with one another will probably be coloured by that interaction, hence introducing a set of variations due to factors not covered by the research question, thus possibly giving false results. (Nyeng, 2012 p.135)

Furthermore, by operating with a differing timeframe of the two phenomena in question, false positives could enter the data by misreading of timestamps, or sources appearing to originate within the specified time that in reality is nothing more than a reproduction of earlier data points. Such reproductions could the distort any potential chronological correlations in the data. In addition, with

this investigation taking place over a limited timeframe, it may not be possible to detect and account for changes in the positions of the sources used.(Busch, 2021 p.54)

2.3. Different approaches

The subject of the thesis being the understanding of a term and its implications on a concept, the choice of design becomes a question of definition. If this was to be viewed as a cultural phenomenon within a certain layer of society, then it could be argued that some form of ethnographical study would be in order. Defining the question as one of a phenomenon, then a phenomenological study with in-depth interviews with key respondents would be appropriate. If, on the other hand, one defines the problem as something very closely linked to context, then a case study would serve best (Busch, 2021 p.54-55).

 In this case, and following from the considerations of the previous paragraphs, it can be argued that this strengthens the argument for a case-study. On the other hand, one could also argue that a focus on MDO as a phenomenon, could warrant a phenomenological approach. Either course of action can produce a viable design, and shed light on the subject, but from differing angles.

Since much of the debate concerning the theme is taking place in and around various pieces of military doctrine and publications, this will be considered in making a choice. Considering this aspect of the argument, the function of military doctrine is not clearly defined. It is however, possible to argue that the objective is theoretical instruction of various organisational groupings or imparting a common frame of mind. (Ydstebø & Høiback, 2012 p.387-393) How this instruction is perceived in various groups, will in some part depend on their specific context, thus further strengthening the argument for a case-study. Taking these considerations into account, the thesis main design will be that of a case-study, but at a fairly wide and shallow one, looking for differences in interpretation across a fairly large number of organisations of the same term.

2.4. Choice and consequences

Based on the considerations discussed above, this thesis will be a literary review case study. This to facilitate the inclusion of sources from or close to the point of origin of the terms and concepts being investigated. One advantage of such an approach, that corresponds with the stated philosophical position, is that a multitude of perspectives, expressed in writing by their proponents will be available for inclusion in the study. In addition, to access a sufficient number of organisations as considered above, utilizing their official, collective publications will give a sufficient, but rough, overview. This will provide multiple angles form which to investigate the problem, thus enabling a certain level of cross-examination. Furthermore, the study will also concern itself with some elements of discourse

analysis, with regards to the terms and their meaning and use as central to the thesis.(Johannessen, Christoffersen, & Tufte, 2016 p.99-106)

On the other hand, this possible profusion of sources can raise several challenges. Firstly, how to sort and order the validity of the sources? Secondly, how to assess if a representative selection of sources has been included in the study? These problems are common for any literary study and must be kept in mind for the duration of both the data collection and analysis. A challenge here is to avoid reference funnelling, being pushed along a certain line of reasoning by following the references used in the initial sources. To reduce this risk somewhat, official publications, be they national or from a major international organisation, will be given more weight than articles or papers discussing aspects of the research question. The challenge is more pronounced when dealing with interpretations of views or concepts presented in official documents. In these cases, a similarly rigid sorting or is not equally clear. Regarding these sources, the reputability of the author(s) and the publisher will serve to sort sources. Despite this, a literary review will be the chosen form of this thesis in order to gain access to the afore mentioned sources and to try and encapsule the nuances present in the debate.(Johannessen et al., 2016 p.99-104)

When conducting analysis of qualitative data, a certain level of interpretation is conducted by the researcher. The quality of these interpretations will vary based on several factors. How close is the researcher to the phenomenon being investigated? The closer one is, the better one is usually able to decipher all the nuances connected to the data, from context to use of specific language. At the same time, such closeness to the subject can lock the researcher into certain lines of reasoning, thus preventing interpretations outside of the accepted scope of the context.(Barber, 2013 p.4-12) However, given that I, as the investigator am also a military practitioner, a certain degree of investigative closeness is unavoidable. The challenge then becomes using the familiarity with the subject matter while remaining wary of the potential biases held due to said familiarity.

2.5. Validity, reliability and coherence

Considering the design and the available sources, several points can be made about the validity of the data points forming the basis for the thesis. When compared to a quantitative study, a qualitative study will by its nature be unable to prove its validity in the same manner, as all data inn a qualitative study is highly contextual. This will render it impossible for any researcher to completely replicate another's data collection and research.(Johannessen et al., 2016 p.27-28, p.231-234)

Taking this into account, it can instead be more precise to discuss not validity in the classical sense from realist ontology,(Angen, 2000, p.378-95) but rather the degree to which the arguments made are logically consistent. If a line of reasoning is logically consistent, then it can, with a reasonable degree of confidence, be argued that the argument represents a point of view held by an actor. From this a certain level of trustworthiness can be achieved, rendering the conclusions of this interpretive inquiry usable. Furthermore, when analysing the data points, a high level of awareness of own known biases can somewhat mitigate the distortional effect of the interpretation. Based on this, interpretive literary reviews can still provide valuable conclusions based on valid, or at the very least trustworthy data, one must just be mindful of the multiple levels of interpretation involved in both acquiring the data and conducting the analysis that results in a conclusion. This credibility can further be strengthened by investigating the same phenomenon from multiple angles or over a prolonged period, thus enhancing the observers ability to understand the context and hence the phenomenon better.(Johannessen et al., 2016 p.232)

Another aspect to consider in this discussion is the degree to which the arrived at conclusions and causal relationships can be transferred to other contexts or environments. A set of conclusions that apply singularly to the case from which it derives is of little practical or empirical value.(Johannessen et al., 2016 p.233-34) This is what can be called the coherence of the reasoning and the conclusion. Given the multitude of perspectives and their separate value as stated above, the measure of quality for both reasoning and conclusions become how well they logically tie together and make sense, how coherent the narrative is.

In the final consideration, it can be concluded that, in moving from a realist ontology in the more classical hard sciences to the more relativistic and context sensitive realm of the social sciences, a shift in qualifier for data and conclusions is in order. Rather than discussing absolutes or hard percentile values, measuring absolute validity when dealing with meaning passed through several layers of interpretation, it is more accurate and meaningful to discuss with what degree of consistency, confidence, and trustworthiness a certain data point is extrapolated, or a conclusion reached. It is this level of coherence that can be observed in the data that gives it value and weight in the shaping of the discourse in this thesis.

3. Clarification of source hierarchy

Building on the considerations above and the design of the thesis a source hierarchy can be established. In a classical approach, the grading in primary, secondary and tertiary sources is closely related to the sources relation to the subject being discussed. This thesis will use a similar a modified version of this typology.

By how the domain term is understood, this paper will refer to several degrees of clarity. The most valuable knowledge of how a source utilizes and understands the domain term comes from those instances where the source itself offers the definition it uses for the term. Such sources will be considered primary sources. However, usage of primary source data is not a guarantee for complete understanding. Any given source can still contain a dissonance between the stated definition and how a term is used. (Johannessen et al., 2016 p.100)

Sources that actively use certain aspects of the domain term either through their description of how they envisage the use of or integration and interaction between domains, will be regarded as secondary sources. These sources offer significant indications of how they view and understand the Domain term through this active usage. But when compared to primary sources, such information is less reliable than the direct definitions mentioned above as it is subject to interpretation. However, in cases where several aspects of the term are discussed, such interpretations can be made with a reasonable degree of confidence.(Johannessen et al., 2016 p.100)

The least reliable data concerning how a source understands the domain term comes from those sources that describes the use, properties, and interactions of domains only fleetingly or not at all. Such sources can typically be those more concerned with certain aspects of MDO or their implications, rather than with what MDO is. Some data concerning the domain term can be inferred from such sources as well, but it will require even more interpretation than the case mentioned above. This will in turn increase the uncertainty associated with the data. These types of sources will be considered tertiary sources.(Johannessen et al., 2016p.100)

When it comes to how the concept MDO and its derivatives are understood, there is greater access to what could be termed primary sources within the framework of this thesis. Give the ongoing intellectual debate about the nature of MDO and how it should be understood, a significant number of sources, both official publications and articles explicitly state their authors understanding of the concept and its implications.

Regarding the domain term, the number of primary sources is more limited. However, several different definitions of the domain term are given, primarily in articles concerning various understandings and interpretations of MDO. In these cases, the articles will be defined in this thesis as primary sources, even though their main topic in most cases is MDO as a concept/phenomenon. This is because investigation of the domain term in some cases is used as an angle of approach on the MDO problem.

When it comes to secondary and tertiary sources regarding MDO, these will be categorized according to the same principles as those governing sources concerning the domain term.
From this it can, according to the sorting criteria above, be expected that a reasonable number of the primary sources regarding either MDO or the domain term, can be classed and used as secondary or tertiary sources for the opposite term/ phenomenon. In total this should provide a sufficient width of available data for the thesis to progress.

4. The Phenomenon

4.1. The Semiotic Triangle

When a word or a phrase is used, one instantly creates a set of mental images of the object or phenomenon being described. The word can be said to have meaning. However, as is often the case, the content of that meaning is not necessarily universal or unitary. In social sciences, this might seem obvious, but there has been, and still is significant debate and research into this matter, although the most formative period of the can be said to have taken place in the first few decades of the 20th century.(Gordon, 2019 p.111-20)

For the discussion of both the domain term and MDO as a concept from this perspective, this thesis will utilize a version of Ogden and Richards semiotic triangle.(Sharoff & Hartley, 2012 p.317-18). In its original form the model was developed to explain and clarify the symbolic process, that is how we move from something being observed to the world, be it object or otherwise, to a symbol representing it through a thought or a reference bridging the gap from symbol to referent.(McElvenny, 2018 p.18-24). Not limiting themselves to language alone, Ogden and Richards also implied a transfer value of to the field of behavioural psychology. In this aspect, they referred to the mental connection made by association when two things correlate or co-occur frequently. When someone observes a certain symbol correlating to or co-occurring frequently with a referent, then they are conditioned to form a causal link between the two, as implied by the dotted line in the model.(McElvenny, 2018 p.18-24)
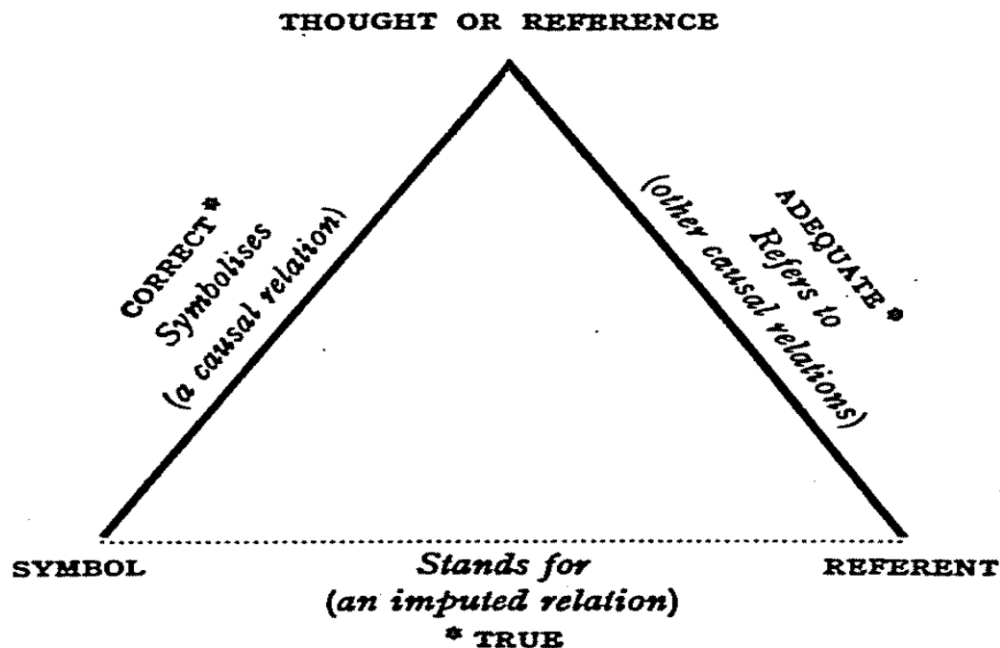

Figure 1: Ogden and Richards semiotic triangle as printed on page 11 of the 1989 reprint of "The Meaning of Meaning"(McElvenny, 2018)

Here the three points of the triangle represents the word/term (symbol), the concept used to shape its content(thought or reference) and the phenomenon it is intended to represent(referent), its meaning if you will.(Sharoff & Hartley, 2012 p.317-19)

Of particular interest from the perspective of the questions in this thesis, is the perceived but not necessarily factual linkage between the symbol and the referent, that may occur. When the word domain is used as a symbol, to what degree are we aware of the thought or reference linking it to the referent? And if we are not aware, to what extent can the same symbol then relate to different referents without this being apparent from the context?

To adapt it to the questions raised in this thesis, the semiotic triangle will be modified. In place of the referent, we will use phenomenon, thus indicating that this can be an object, an occurrence or something more abstract. In order to assign a symbol to this phenomenon, it is processed through a mental model assigning attributes and linking the phenomenon to the symbol. As in the original semiotic triangle, the repeated co-occurrence or observed correlation of the phenomenon or the assigned symbol is likely to create an implied link directly from the symbol to the phenomenon. This learned apparent linkage, can be a source of ambiguity when something is discussed, as similarities of meaning is inferred from the usage of the same symbol without considering any potential differences in the mental model applied to link the symbol with the phenomenon. If this is done when there are several different mental models that could be in play, the discourse in question could well produce false results.
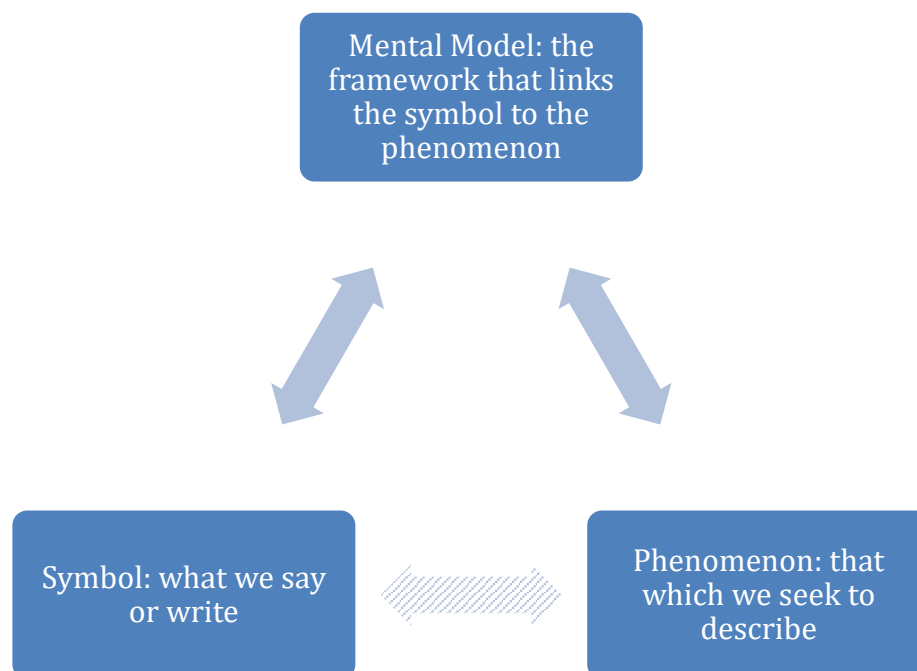
Figure 2 Adapted semiotic triangle

Using this model as an analytic framework, the usage of domain as a symbol in the current debate concerning MDO will be examined to ascertain to what extent the mental model linking the symbol is unitary, and if not, to what extent are the different mental models stated when utilizing the symbol in constructing a line of reasoning.

As a second step, using the same basic model as a starting point, and expanding it to include a possibility of the phenomenon being a problem set to be answered and the symbol a proposed solution, the mental model now also includes all the restraints and constraints anyone trying to create a solution are faced with, thus forming a lens through which the problem set is considered before a possible solution is suggested. Furthermore, the restraints and constraints are not universal, thus giving rise to several possible solutions.

From this inner layer, possible solutions are again subjected to another lens of constraints and restraints before each giving rise to various possible implementations. This can partially be visualised in figure 3, where each implementation only represents a fraction of the total "circumfence" of possible implementations. This alone will not be very surprising, but when referring to the initial semiotic triangle, what happens when these implementations are assigned the same or similar symbols even though they are literally diametrically opposite with regards to the process of filtering that has created them as mental model? Are we the aware of the possible differences in referent between these symbols? And if not, how can this affect the outcome? These questions will be applied to the analysis of a few of the various expressions of MDO.

Figure 3 Various solutions and implementations

5. The Domain Term

5.1. Origin

The origin of the domain term in military literature predates the MDB/MDO concept(s) themselves. This can in part be inferred by the way the term is used in the referenced TRADOC publications. In these publications, the term is used without any explanation or definition, thus seemingly indicating a tacit expectation that the reader is familiar with the term and that its understanding is uniform. Similarly, a cursory browsing through various debates over military theory, will provide a reasonably firm foundation to state that the domain term has been around since before the advent of the MDO concept, and that it has been used in a way that implies a certain universality by way of lacking definitions offered. (Heftye, 2017)

This is an inferred observation, since an explicit definition of how the domain term is understood is not included in ADP 3-0, neither in the terms list nor the glossary (Headquarters, 2019). Referring to the semiotic triangle, this means that there is no indication given of the concept used to translate the symbol to a phenomenon, or vice versa. Furthermore, with reference to the categories established earlier, publications from TRADOC will be considered primary sources with regards to MDO as a concept, given that organisations role in bringing the concept to relevance. (Lyons, 2022) At the same time, and in line with the assumption made earlier and the usage of the domain term as stated in the previous paragraph, concerning the understanding of the domain term, most TRADOC publications are at best secondary sources as they do not provide explicit insight into the understanding of the term used through s stated definition.

 A similar interpretation of the degree to which the term is understood, or not understood is put forward by both Heftye and Donnely & Farley in two separate articles in 2017 and 2018 (J. Donnelly & Farley, 2018; Heftye, 2017) Articles such as these will be considered primary sources for both the investigated variables. This is since they explicitly investigate a link between the understanding of the domain term and one or more interpretations of MDO as a concept. This choice rests on an assumption that the way MDO as a concept is expressed, should in part be influenced by how the domain term is understood and used in its construction.

5.2. The NATO perspective

In its Alliance Concept for Multi-Domain Operations, NATO appears to present an understanding of the domain term as something military in nature, or at least containing a distinct military sub-category. The publication explicitly states that MDO takes place across what it terms "*the five operational domains*", indicating the existence of a clearly defined military category or grouping within the domain term, that it does not explain further.(NATO, 2022) The usage of the operational qualifier

attached to the domain term is interesting, as it can be argued that this represents an understanding of the term that is aligned with the one presented by Donnelly and Farley in 2018. This definition aims to encompass the domain term entirely as a: *"Critical macro __maneuver__ space whose __access or control__ is vital to the __freedom of action and superiority__ required by the mission."* (J. Donnelly & Farley, 2018)(authors italics and emphasis). It can be argued that the focus on manoeuvre, access and freedom of action relates directly to the operational qualifier used by NATO and represent a similar if not identical understanding when addressing those specific domains. However, directly in line with the theme of this thesis, NATO in the publication of the Alliance concept for MDO, states clearly the position that national descriptions of either the term Domain, or the implications of what MDO is rarely match(NATO, 2022).

Furthermore, adding a certain degree of ambiguity, in the NATO terminology database, the term domain either relates to a part of a computer network or "A specific field of knowledge or expertise"(NATO Standardisation Office, 2022b) This definition matches the one found in dictionaries and critiqued by Donnelly and Farley as being too narrow and unable to catch all the nuances implied by common usage of the term. Looking back at NATOs own concept for MDO, this concept would not create the same meaning if it was describing how to operate within multiple fields of expertise. In its strictest sense, it can be argued that one can still create a MDO term conveying something of the same complexity and need for convergent action using fields of knowledge as building blocks. However, it is unlikely that it is this interpretation of the term that was intended in the alliance concept when viewed through the lens of the challenges described therein. These challenges have too much of a physical and/or spatial dimension to them for that explanation to be very probable.(NATO, 2022)

Reaching back to the challenges described in the methodology chapter, by addressing the revision date of the different entries, 2005 for the standards database and 2022 for the concept, several possible explanations can be offered for this observation of apparent divergence. One is that these two variations represent an evolution within the timeframe. On the other hand, if that is so, then why is not the standards database updated? And why does the concept state that a multitude of different understandings of the term exists? Given the size of NATO on an organisational scale it would not be outside the scope of credibility to claim that organisational inertia might account for the divergence, thus rendering the divergence temporary rather than definitive. On the other hand, this explanation grows weaker with the progress of time. However, definitive clarification of this would require further research.

For the purpose of this thesis, the divergence will be treated as indicating the probable existence of various definitions and understandings of the domain term, thus supporting the statement that there is

confusion and contradiction regarding the domain term. In terms of source quality, this is not a proven fact, but rather a statement that can be made with reasonable degree of certainty, and coherent with the information present.

Taking this apparent divergence into account in the process of conducting further work on an MDO concept, NATO gives a definition of what the alliance considers MDO to be, or at least several hallmarks of the phenomenon. This definition is understood to be a work in progress as it is also acknowledged that the definition will require further refinement through internal processes in order to facilitate consensus (NATO, 2022). The reference to internal processes may indicate a tacit acknowledgement of the role of organisational inertia in creating apparently divergent definitions. Or it might simply refer to the influence the need for consensus have in NATO processes, even down to the level of concepts and documents (Michel, 2014 p107-123). Given the divergence in possible understandings of the domain term, but also considering the possibility of false direct links between symbol and referent, this consensus approach can produce various outcomes.

When discussing the difference between Joint- and Multi-Domain-Operations, Perkins and Olivieri note that in a Joint approach, separate domains are acknowledged, and that operations in a single domain is usually led by a single service(Perkins, 2018). From this one can infer that a certain variant of understanding of the domain term contains a level of exclusivity. The domain can be delineated and put under the discrete control of a single service operating within its boundaries. However, this can stem from practical considerations founded in the Merriam Webster dictionary definition of the domain as a field of expertise as well (Webster, 2023). Operating from this definition, the separation into semi-exclusive spheres of responsibility is a rational way of concentrating effort and expertise according to traditional economic specialisation theory (Crockett, Smith, & Wilson, 2009 p.1162-88; De Roest, Ferrari, & Knickel, 2018 p.222-231). A challenge arising from this way of organising, that can become particularly pertinent when a process or an operation takes place across the perceived boundaries of these fields of expertise, is the territorialism within each silo as it is defined in organisational literature.(Fenwick, Seville, & Brunsdon, 2009 p.5-7) Even if this is a phenomenon from general organisational theory, the effects are familiar enough that an analogy to coordination challenges and competition between organisations within the military may be used. Furthermore, the hallmarks that may indicate a slide towards a degree of silo mentality or "turfism" are readily apparent in a military organisation with its zero-sum budgetary game and strong cultures aligned along service lines.(Fenwick et al., 2009 p.5-7)

5.3. The US Army perspective

In ADP 3-0, the word domain itself is first used in section 1-22, simply stating that the ability to employ resources across multiple domains is one hallmark of a peer adversary (Headquarters, 2019 p.1_4). This usage gives little information about what the term means, but several data points can be extrapolated from this usage. Firstly, it is not on the modified terms list, nor is it explained in detail. This implies a level of expectation about the readers understanding of the term, indicating an expectation of a direct link from symbol to referent without the need to articulate the concept assigning meaning. Such a level of expectation indicates that the writer of the text is certain that the reader will attribute the same meaning to the term, using the same concept with the same content. However, this does not automatically indicate that the term is considered by the author to be universally defined. In the preface, it is clearly stated that the primary audience are "all members of the profession of arms" (Headquarters, 2019 p.iii). Thus, our two primary points are that the term, or symbol, is understood to have a common meaning within the entire audience, but that this audience encompasses all members of the (US) armed forces, while at the same time making no claim to universal understanding among the general populace.

The treatment of the domain term within ADP 3-0 is consistent, with further examples of implied familiarity given for instance in section 1-54 where the term is used in describing the attributes of a Joint operation. In section 1-67, the domain term is also used to describe the boundaries to be bridged simultaneously when presenting an opponent with dilemmas with the aim of driving said opponent into an untenable position (Headquarters, 2019 p.1_9-11). In addition to indicating expected familiarity, this last usage of the term, by the usage of boundaries implies a certain territorial aspect to the term.

At the same time, there appears to be a certain degree of ambiguity within the US armed forces with regards to the term, especially when considering the less tangible domains. One example is the description of the so-called information environment and its implications as given below:

"1-9. Modern information technology makes the information environment, which includes cyberspace and the electromagnetic spectrum, indispensable to military operations. The information environment is the aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information (JP 3-13)"

To meet these challenges, a heavily techno-centric construct called the Army Unified Network, with a series of hallmarks and requirements, that by some of the discussed criteria could constitute a domain in itself, is envisioned and described. (Martin, 2021)

If the term is as universally understood as implied by its usage in ADP 3-0, then what separates a domain, as cyber is sometimes defined as, from the information environment? From the description above, it can be argued that the information environment requires specialised knowledge, can be used for manoeuvre, can present the opponent with a dilemma, and is indispensable for military operations. If an analysis of one of the more "traditional" domains, such as land, sea, or air, was conducted, then it is reasonable to expect that all of the above attributes would be attached to them as well. Such apparent contradictions as this strengthen the statement that there is more ambiguity connected to the domain term than the initial usage might imply. Another example of the same phenomenon can be inferred from the description or usage of a so-called cognitive domain (Takagi, 2022). This is a version of the domain term not widely used in the US debate, but quite prevalent in the Chinese approach to gaining information dominance through various means. In that regard, this example underscores the point made about the ambiguity of the term due to content varying with context. What the potential implication of this ambiguity might be, with regards to differing understanding, will be partially addressed later.

5.4. Current debate

When considering the domain term within the framework of the ongoing debate concerning MDO as a concept, several observations can be made. Firstly, a large portion of the contributors to the debate do not feel the need to give a definition of their understanding of the term. This can for example be seen in the article COMPLETING THE KILL WEB: THE MULTIDOMAIN RECONNAISSANCE TROOP IN THE LITTORALS, by Sean Parrot (Parrot, 2022). In this piece, the term is used without any further clarification, the reader is expected to have a uniform understanding of the term. Given the theme of the article, discussing MDO from a tactical perspective, this is interesting. When contrasted with the UK Joint Concept Note 1/20 concerning Multi-Domain Integration, who devotes two pages to explaining its interpretation of the domain term and the implications of this interpretation (Concepts and Doctrine Centre Developments, 2020 p.17-18), it can be argued that the understanding might not be as common as the Parrot suggests. Especially since JCN 1-20 goes as far as describing the term not as something concrete, but rather a mental tool for usage in structuring a thought process. In addition, JCN 1-20 is interesting from a source perspective, as it offers a definition of the domain term while discussing its version of MDO.

This also plays into the potential artificial divergence between the domain term and the environment term as seen in US JP publications above. Already in the UK Future Operating Environment 2035, cyberspace is considered as a separate entity, not because is exists apart, but because it is predicted to permeate all other environments, underpinning, enabling and connecting (Concepts and Doctrine Center Developments, 2014 p.19-20).

In this manner, the description of cyberspace is not that different than previous descriptions of the oceans as the great connecting highways. Using this as a metaphor, it can be argued that the line between environment and domain, as used in the publications is more about the development of our capability to utilize the area in question than any fundamental difference. This maritime metaphor has already been utilized by Dr Bleddyn Bowen in a RUSI podcast concerning space as a domain (Bowen, 2021). Looking at the 2D mosaic visualizing the domains in UK doctrine(Concepts and Doctrine Centre Developments, 2020 p.18), it is fairly straightforward to picture cyber/EM as a virtual ocean lapping at the shores of the other domains. However, by this line of reasoning, it could be reasonably argued that the previously mentioned cognitive domain could be justified as equally underpinning or all-encompassing as cyber, thus invalidating this as an exclusive sorting criterion.

Furthermore JCN 1-20 attempts to separate the operational domains from the environments by degrees of continuity and association, making the environment something that persists before and after any military action, while the domains are definitionally linked to military action by association and thus fleeting in time as well. This is an approach that in some ways can be said to harmonize with the NATO definition, focussing on knowledge and expertise, hence activity, rather than physical attributes.(Concepts and Doctrine Centre Developments, 2020 p.17-18; NATO Standardisation Office, 2022b)

On the other hand, the deviation could also arise from different contexts surrounding the two sources. Parrot largely describes a force construct on the tactical level that can leverage and use various physical capabilities across various physical domains (Parrot, 2022). In this regard, his usage of the domain term has more in common with the dimensions of warfare as used in US publications before 2000 (Heftye, 2017). Without stating it explicitly, Parrots tactical perspective defines domains as a physical space through which physical effects and objects flow, be it munitions, electromagnetic radiation or even personnel. The UK interpretation on the other hand is used in a context regarding a continuous spectrum of competition between nations(Concepts and Doctrine Centre Developments, 2020 p.3-6). In this context all the levers of national power are continuously utilized to gain a fleeting advantage that can be maintained only through continuous effort. Here, domains, or to be more precise, operational domains, are defined as: "discrete spheres of military activity within which operations are undertaken to achieve objectives in support of the mission." (Conceps and Doctrine Center Developments, 2022 p.45) Thus it can be argued that there exists a spectrum of what makes up a domain, from the almost vector-like medium assumed by Parrot from a tactical perspective, to the supporting tool for understanding an arena for competition described by the UK MoD from a more strategic perspective.

Such a spectrum could also be expected from the layout of the semiotic triangle. The domain term as a symbol is attached to several different referents through the application of different concepts. These concepts can, as shown by the examples above, be either explicit or implicit, and this difference can add confusion to the debate, as an implicit concept can create the false impression of a direct linkage between the symbol and a certain referent.

5.5. Difference by level

If one considers the definitions of the various levels of warfare used by western powers, from tactical, through operational to strategic (Forsvaret, 2019 p.243, p.249, p.251) (Headquarters, 2019), the differences in perspective can be understood as logical. Just as something done at the tactical level is made up of technical effects and actions, then a domain in this perspective can be understood as a vector for these. Continuing this line of reasoning, any strategic action is comprised of several operations, and a domain becomes the realm within which the operation can be carried out. From this line of reasoning, a case can be made that the domain term is interpreted in relation to which level of combat or competition one is considering. If this holds true when checked against other sources, then the causality suggested by the research problem between understanding of the domain term and the understanding of MDO is significantly weakened. An interpretation through the lens of levels of command or arenas of competition can instead provide an alternative hypothesis.

The content of the domain term and the understanding of MDO is shaped by the command level both are viewed through. Or put another way, the concept used to link the domain term as a symbol to a certain referent is determined by the level of command. Following from this, the connection between the domain term and MDO will vary according to the chosen perspective. This would suggest that the independent variable is not the understanding of the domain term, but rather the level of competition being considered, with both MDO and the domain term as dependent variables.

However, that would require the interpretation of the domain term to be explicitly linked to varying levels of command or competition in at least a majority or significant minority of the primary sources. Considering the definition of the UK understanding of the domain term, as stated in Joint Concept Note 1/20, this is not explicitly the case from the UK MoD point of view (Concepts and Doctrine Centre Developments, 2020 p.17-18). ADP 3-0 also uses the domain term but does not explicitly state its understanding of it. Rather, ADP 3-0 gives its interpretation of a joint operational environment, made up of various domains, and the information environment, the electromagnetic spectrum and so forth (Headquarters, 2019 p.1_1-2).

This is an interesting find with regards to the alternate hypothesis concerning causality. An absence of clarification of the domain term, while still using it in constructing other artefacts indicates an expectation, as pointed out earlier, that the term is self-explanatory and unambiguous in use within the framework of the publication. Such an expectation differs from the UK need to define or explain what is meant with the term, or actually going as far as devoting a section of the JCN 1-20 to explaining the way both the domain and the environment is understood. Furthermore, this find also weakens the hypothesis linking the understanding of the domain term to a level of command or competition, as such a linkage would not be unambiguous. It is also worth noting that the two publications do not agree on how many domains exist within the military sphere or how they are delineated. This difference is further underlined by JCN 1-20 explicitly stating that it is exlusive in considering EM/Cyber as a common and independent domain in its own right. (Concepts and Doctrine Centre Developments, 2020 p.17-18). In sum, this also contributes to a weakening of the connection between level of competition and understanding of the domain term. These diffuse meanings and linkages can also be related to some of the challenges inherent in a qualitative literary review such as this, with multiple layers of interpretation stacked up on top of one another. This can potentially render linkages diffuse as seen above.

If we look at how NATO treats the domain term in its Initial Alliance concept for Multi-Domain operations, it does not give a definition of the domain term within the publication. However, in COPD, Annex K, NATO defines a domain as "A specific sphere of activity or knowledge"(Operations, 2021). Defining the term in this way, is also one of the options presented in the NATO Standards database (NATO Standardisation Office, 2022b). This definition is fairly close to the one suggested by Erik Heftye in a 2017 article following the launch of the multi domain battle concept by the US army (Heftye, 2017). On the other hand, it is also a definition that differs significantly from the more elaborate one found in JCN 1/20, leaving room for interpretation as it is broader in its approach.

One important aspect to consider concerning the NATO definition is that is does not provide any tools to discriminate between the domains, nor define them as either permanent or transient. In addition, it also gives a list of the domains in question differing from both ADP 3-0 and JCN 1/20 (NATO, 2022). These three data points indicate that the term may not be as universal or unitary as implied by its usage in ADP 3-0. The same potential challenge concerning the term was put forward by Erik Heftye. In his article he raises several problems associated with the uncritical use of a term as unitary without giving due consideration to its various possible interpretations and implications (Heftye, 2017).

Heftye's main line of argument was that the differing implications of the term could lead to it being used to shore up organisational boundaries between services, thus creating barriers to cooperation and

coordination, further exasperating the silo problem discussed earlier. Given how much of the debate surrounding MDO is centred on an increase in simultaneous action from various actors, this is an interesting paradox. An example of how this can play out can be found in an article by Tyson B. Meadors in *Proceedings.*

In this piece he argues for a retained Navy cyberwarfare capability, and goes on to conclude with a call for action in the "Maritime cyberspace domain"(Meadors, 2022). In broad strokes, Meadors argues for what can be interpreted as a partitioning of cyberspace into pieces safeguarded by the existing services. Such an approach is not illogical but can be argued to represent a territorialist take on the domain term. Using this perspective on the domain term can lead to the term being used as more of a tool in an organisational zero-sum game rather than an aid in constructing appropriate and useful mental models.

If the domain term is understood to imply ownership or dominion, as suggested by Meadors apparent need to attach navy or maritime prefix, then it must be fought over by an organisation to secure the required funding(Heftye, 2017). Such organisational rivalry is well documented in research from various geographical and cultural areas, representing a belief in distribution or transaction as a situation in which there can be no mutual benefit from the transaction in question (Johnson, Zhang, & Keil, 2022 p.455-74). This way apparent way of approaching the domain term is significantly different from both the NATO standard, the UK approach, or the more complex one suggested by Donnelly and Farley.

Another example that illustrates the variety of ways the domain term can be interpreted comes in the form of a statement that "logistics is the 6th domain of warfare", which can be attributed to either ADM(Retired) James Foggo, or former assistant secretary general of NATO, Patrick Turner(@AtlanticCouncil, 2020; Kraetzer, 2022). Turner's statement is just that, a statement without an accompanying elaboration. Foggo`s use however, comes with a reasoning behind the statement. Extrapolating from both the experience with exercise Trident Juncture 2018 and exercise RimPac 2022, Foggo underlines the importance of logistics in both enabling and sustaining operations. Based on this importance he elevates logistics in general, or logistics at sea as a domain.

This way of using the domain term comes with several implications. Firstly, elevating or defining any activity or joint function such as sustainment(Staff, 2022 p.III-1) to domain status can be taken to indicate a understanding of the term that differs significantly from the ones previously discussed in this article. Here there are no defining characteristics that define a domain, rather it is the perceived importance of a function that warrants the term. In some respects, this corresponds with the definition

used by Donnelly & Farley, namely *"Critical macro* **maneuver** *space whose* **access or control** *is vital to the* **freedom of action and superiority** *required by the mission." (J. Donnelly & Farley, 2018)(authors italics and emphasis).* Regarding the criticality of access to and control of sufficient sustainment the connection in the use of the term is apparent. However, it is more questionable if it can be said that the supply chain constitutes a manoeuvre space rather than underpin physical or other manoeuvre.

Secondly, making function and space, either physical or virtual, interchangeable is somewhat more problematic. If this interchangeability is stretched further, then does that make the other joint functions domains of their own as well? Doing so would then lead to the questions regarding for instance the fires joint function. Is fires then a domain in itself, or a function carried out within and across other domains, or physical dimensions? Discussing these questions are outside the scope of this thesis, and will not be pursued further, however investigation into the various implications of different interpretations could warrant further research.

However this usage of the domain term can also be interpreted as a variation of one of the problems put forward by Heftye, namely the territorial or possessional aspect of the word.(Heftye, 2017) Following this line of reasoning, elevating something to a domain, implicitly lays claim to a certain portion of the available resources in any given situation, and an expectation of a certain degree of autonomy. If viewed through this lens, Foggo's remarks make sense as the statement is followed by an argument for allocating more resources to building up US sealift capability and on-shore logistic support structure(Kraetzer, 2022). This would, using the territorial analogy for the domain term, increase the size and prestige of the realm.

As shown, the domain term can be interpreted in in various ways, that impact differently on how a construct in which it takes part appears and is understood. The level of nuance is, given both the number of different sources, and the variations in interpretation quite impressive. However, as a tool for further analysis, some broad outlines can be summarized in the table below.

Interpretation	Attributes	Impact on MDO/MDI	Sources
Medium through which objects/effects can flow, manoeuvre space	A physical space in the extended form. Persistent regardless of military operations.	Lends a physicality to MDO, leaning towards the AirLand battle 2.0 interpretation	TRADOC, Donnely & Farley, Parrot
Organisational or territorial demarcation	A construct in itself, abstract and used in creating organisational clarity	Turns the concept more inward. Focus on how one or several organisations or areas interact	Foggo, Turner, Meadors
Field of knowledge/expertise	Mental sorting category, partially descriptive.	Imparts some facets of complexity through the integration of various fields of knowledge	NATO, Merriam Webster
Building block in a mental model	Mental tool, abstract concept to order ones thoughts.	Makes the construct more abstract and broader.	JCN 1-20

Table 1: Domain interpretations summarised

This outline is not exhaustive, but povides a summary of the main variations within the usage and understanding of the domain term found within the investigated litterature. In addition, preliminary linkages to how these interpretations can impact a MDO construct is shown, along with some of the sources espousing them.

Despite beeing non-exhaustive, the table gives some initial indication of the great variation in expression of MDO as a concept the various interpretations of thedomain term can engender. These differences and possible linkages will be investigated further in the following sections of the thesis.

6. Multi Domain Operations

6.1. History of the term MDO

Some of the earliest mentions of something crossing multiple domains is not operations, but battle. In this form, one can find the term Multi Domain Battle in several US Army publications from 2017 and 2018. To be specific, in ADP 3-0 and FM 3-0, the term MDB is described in some detail (Marr, 2018 p.1). From an epistemological perspective, this is interesting, since this represents MDB as an attempt by several groupings within the US Army to redefine the place and utility of the army within the spectrum of government tools, using a known framework to create a new paradigm of utility. In line with this, one can also trace a degree of evolution rather than revolution in the use of the term. After all the title of the TRADOC White Paper partly responsible for launching the term is Multi-Domain Battle: Combined Arms for the 21st Century (Marr, 2018 p.1). This might be nothing more than a device to signal the importance attached to the concept, playing on the decisive impact use of Combined Arms have had in previous epochs.

However, this approach to the link is somewhat weakened by the titles and content of the following publications from the same source expound on the evolutionary link with the title: Multi-Domain Battle: Evolution of Combined Arms for the 21st century, 2025-2040 ((TRADOC), 2017). Furthermore, this apparent evolutionary approach goes beyond the title. In describing the need for a new concept, the publication frames the problem as one of increased competition across multiple domains, increasing the need for coordination, but not fundamentally altering the principles applied ((TRADOC), 2017 p.i-ii).

As discussed in the domain section of the thesis, these publications utilize an implied common or universalist understanding of the domain term. ((TRADOC), 2017) From this implied understanding, the term is used as a building block in creating new construct for solving a certain operating environment. ((TRADOC), 2017; Headquarters, 2019).
This gives a jumping off point for the MDO-term or construct, not as Multi Domain Operations, but as Multi Domain battle. At this point in its history, it could be argued that the term is an evolution of the AirLand Battle concept with is focus on using assets from outside the army to create effects across multiple domains, as the term is used in TRADOC parlance, in a wider area (Curatola, 2013 p.89-91). Both concepts focus on using various means in concert to present the opponent with an insoluble problem, varying more in degree and scope than in principle (Curatola, 2013 p.89-91; Headquarters, 2019 p.2_1-5). This reasoning is further supported by public statements made by senior U.S. political figures as the U.S. began shifting its focus from low intensity conflict to peer or near-peer competition. In remarks made to the Army War College, deputy Defence Secretary Robert O. Work

outlined the need for a Third offset in technology to solve the peer denial challenges technologically. Following this, the army should fight what he termed an AirLand Battle 2.0 (Tony, 2015).

Taken together with the Army centred approach in the original publications describing the MDB concept, this seems to indicate that MDB originated as an evolution of an existing concept, that mainly deals with the traditional military aspects of a nations policy. However, as stated in ADP 3-0s description of the operating environment, factors outside the traditional military scope is increasing in importance for the outcome of the armed contest (Headquarters, 2019 p.1_1-2). Furthermore, it can be argued that the concept is not only evolutionary, but also reactionary in origin. This is not to say reactionary in terms of trying to undo a set of circumstances, but rather in being a response reaching back in time for a reference solution to a perceived change in the framework the organisation is expected to operate in.

Having established the lineage of the concept from a US Army origin, the usage of the term becomes somewhat more divergent. The first point of divergence comes within the US system itself. All publications entailing the use of more than one branch of the armed forces, are considered Joint Publications (JPs). These are to be issued and approved by the Joint Chiefs of Staff. It is in these publications that the "principles that guide the employment of US military forces in coordinated and integrated action toward a common objective." are enshrined (Katsos, 2021 p.88-96). Thus, paradoxically, the originator of the concept does not have the authority to prescribe a common understanding to most of the involved parties.

A further indication of the continuity of the debate rather than the disruption, can, among other examples be taken from as far back as the debates concerning the proper organization and employment of armies in the second half of the 18th century. In his writings, chief among them the Essai général de Tactique, Jaques-Antoine-Hippolyte, Comte De Guibert, continuously stresses the importance of speed as a key factor in achieving success alongside simplicity and flexibility (Abel, 2014 p.81). These key points could, context aside, be inserted directly into the description the US. Army uses to describe the advantages of MDO, namely seizing the initiative through timely action (Headquarters, 2019 p.1_11). And then using this initiative to present the opponent with the afore mentioned multiple insoluble dilemmas.

However, it can be argued that a very large portion military developments throughout history have had an element of speed, either tactically, strategically or in communications. In some instances this change has been sufficient to render all others impotent to a degree indicating revolution, for example the strategic mobility of the French Republican armies of the early years of the Napoleonic wars,

whereas in others several changes cancelled one another out and resulted in stalemate as in WWI on the western front.

6.2. Various expressions of MDO

6.3. US

Describing a singular US approach to MDO might not be practically possible. This is due to the level of autonomy granted to the respective services. Using the freedom of action granted by this independence, the services each have their own version of what MDO means to them, while the Joint Chiefs of Staff also issue their take on MDO(Headquarters, 2019; Speller, 2022; Tangredi, 2022; Voltz, Reith, Long, & Dill, 2021). Given that one of the common themes in all the takes on MDO is the convergence of multiple actions across several domains, albeit with some variations in how that term is used, to present an insoluble dilemma to an adversary, this seeming divergence in description of how to achieve said convergence can be described as paradoxical.

However, the same disunity can be an expression of one interpretation of the domain term as addressed earlier in the paper. If the domain term is taken in its territorial form, denoting organisational demarcation, and used as a vessel for bureaucratic infighting, then having a different MDO initiative or interpretation for each service makes sense. As MDO is the new buzzword, any sensible service chief needs to show the organisational relevance of his or her organisation by crafting a concept that highlights one's own importance. That such fragmentation of understanding can seem illogical takes a back seat to political, organisational or budgetary considerations.(Fenwick et al., 2009 p.5-7; Johnson et al., 2022 p.455-88)

Based on this plethora of various sources and interpretations, this thesis will consider those variations of MDO, if any, that can be found in the most overarching documents within the US armed forces. In this context, that means looking at publications from the Joint Chiefs of Staff, namely the capstone publication, JP 1, and the JP 3-0 operations series. These publications are chosen due to the overarching authority of the publisher and the role of the Joint Chiefs in orchestrating all means at their disposal. Publications such as these will, balance between being primary and secondary sources depending on their giving a definition of the term or concept or not. Furthermore, to maintain a functional hierarchy among publications, the chairman of the Joint Chiefs has since 1986 carried the sole responsibility for joint doctrinal development (Katsos, 2021 p.88-96). Based on these considerations, the case for using these publications as a primary indicator for a doctrinal US understanding of MDO can be made.

On the other hand, reading a US interpretation of MDO from the JP series as mentioned above, comes with a disadvantage. The time elapsed from the launch of the concept around 2017, is within the 5 year timeframe valid for the revision cycle up until 2019 (Katsos, 2021 p.88-96). Furthermore, this timeframe was frequently overrun(Katsos, 2021 p.88-96). Since 2019 revisions have been conducted on a "as needed" basis with a shortened staffing cycle. This alteration will allow for a larger degree of central control, enabling the joint staff to manage change in doctrine as more of a top down process (Katsos, 2021 p.88-96). These cycles, and the transition from regularity to on demand revision creates a situation where the entire development of MDO as a concept can potentially have occurred without a revision of the pertinent publications from the Joint Chiefs. From a conceptual perspective, it is worth noting that the umbrella under which the US DoD is seeking to collect and focus the efforts of the branches is labelled as Joint All Domain Command and Control (JADC2), eschewing any reference to Multi Domain.(Hoehn, 2020) This may stem from organisational inertia, but it may also represent a certain scepticism as to the maturity or even feasibility of the networking requirements inherent in most MDO expressions

Another observation is that MDO as such is not listed in either JP 1 or JP 3-0. This can be interpreted in several different ways. One interpretation is that MDO still remains primarily an Army term, as reflected in its origin in TRADOC publications ((TRADOC), 2017). However this does not hold up to the data found in the number of discussions surrounding what MDO is and how to prepare to fight it that are frequent in all service branches (H. V. J. R. Donnelly, 2019). Furthermore both the USAF and USN have their own versions of a MDO concept, although under different names and with a variation in emphasis.(Berger, Gilday, & Schultz, 2020; Voltz et al., 2021)

Another interpretation can be found along the lines discussed by Venable and Donnelly. It can be argued that the absence of a definition of MDO on the level of the publications issued by the Joint Chiefs indicates an understanding that MDO is a concept that belongs somewhere on the tactical or operational level and is thus outside of the scope of mention at the military-strategic level. If this holds true, then the potential for misunderstanding when faced with more whole of government inclined interpretations is significant.

A further possible explanation that can be argued from the changed revision cycle as discussed above, is that the Joint Chiefs are using the absence of set revision timelines to allow the concept to mature or coalesce further before then conducting a on demand revision.
Regardless of which of these explanations, if any are applicable, there are further points to consider about the extent of the concept with regards to instruments of power.

6.4. Instruments of Power

When discussing whole of government approaches in relations to utilization of military force, this is kept separate from the MDO term, and described in more traditional terms as orchestrating the instruments of national power. This orchestration shall ensure that the states national security interests are served throughout a spectrum of cooperation and competition up to and including armed conflict(J. C. o. Staff, 2018 p.I-1). From a traditional point of view, this is to be expected, as such coordination usually resides on the political-strategic level. However, when compared to other interpretations, especially the UK one, this can be a source of confusion as will be discussed further at later stage.

A common thread running through the US debate and various interpretations of MDO, is the fear of currently or in the near future losing a technological edge that has underpinned much of US military thinking since at least the 1980s. From this perspective, various forms of MDO can also be seen as leverage to spur technological developments. Here the concept is used to construct a narrative that all major competitors, mainly China, are already operating across all domains, all the time making it essential to rapidly improve the technological level of US forces in order to not be rendered impotent.(Foggo III & Fritz, 2016; Votel & Geurts, 2022)

However, the state of technological development in particular, or industrial base more in general, is seldom considered or discussed as a facet of MDO, or a comprehensive discussion of the state's power in an integrated competition. This is even though both Economy and Infrastructure make up parts of the DIME and PMESII analytical constructs.(Hillson, 2009 p.235-238; Kodalle, Ormrod, Sample, & Scott, 2020 p.12-15)

6.5. NATO

As an alliance made up of 30 countries of various size, power and interests, NATOs take on MDO might not be the most provocative or crystalline. Given the alliance need for consensus, it can be argued that it represents as close to a common understanding of the concept as one can come among the member states. There are a few caveats though. Primarily, the size of US influence on the organisation might shift the alliance perspective to favour a US interpretation. Secondly, given that NATO is primarily able to wield the military instrument of power, a certain focus on a military-centric approach to a MDO concept can reasonably be expected.

An interesting jumping off point, with clear relevance to the research problem of this thesis is the following statement from the NATO concept for MDO: "MDO is a logical evolution from Joint to a more domain focused approach and to better embrace Space and Cyberspace capabilities, but many Joint principles remain valid when considering military and synchronised non-military activities across five domains." (NATO, 2022) This statement gives one interpretation of the understanding of

the content of the MDO concept and its lineage in NATO. However, there appears to have been some debate about whether there is any point in discussing MDO given the state of the NATOs maturity of command. In a 2018 article, Perkins and Olivieri point to a level of command maturity barely sufficient for Joint operations, much less what seems to be envisioned as MDO (Perkins, 2018).

From this perspective NATOs focus on the evolutionary nature of MDO serves a purpose with regards to maintaining the credibility of the alliance C2 structure while at the same time serving as a catalyst for upgrades and improvement. This evolutionary approach to MDO contrasts quite starkly with the more revolutionary and visionary thoughts expressed in for example the US *Joint Concept for Integrated Campaigning.* This publication appears to aim for integration of military actions as a means to achieve a level of simultaneity generating the necessary amount of dilemmas for the opponent (J. Staff, 2018 p.6-9). In contrast to synchronization, integration indicates a much higher level of interaction between the activities taking place, and the preceding and concurrent plan- and decision-making process. If the maturity of the C2 structure can be questioned and the integration is to be conducted with a collection of forces from various troop contributing nations with a finite amount of joint training, then the realism of this level of integration can be questioned.

Based on this observation of a possible divergence in level of ambition, a potential consequence of the various interpretations can be stated. If the level of ambition with regards to training and integration differ significantly, then adaptation to one or the other might be mutually exclusive.

6.6. UK

The UK approach to MDO differs somewhat from the one found in either the US or in NATO. Primarily the difference between the NATO and US concept(s) and the one described in Joint Concept Note 1/20, lies in the level of command the concept appears to be addressed to (Concepts and Doctrine Centre Developments, 2020 p.i-viii). Where the US and NATO concepts primarily concern themselves exclusively with military actions, the UK concept, termed "Multi Domain Integration (MDI)" to a larger extent considers a whole of government approach (Concepts and Doctrine Centre Developments, 2020 p.i-viii). Instead of looking almost exclusively at ways of utilizing the different components of military power, while acknowledging the existence of other factors, MDI attempts to conceptualize a better way to make all the national instruments of power converge to handle a certain challenge, as illustrated below.
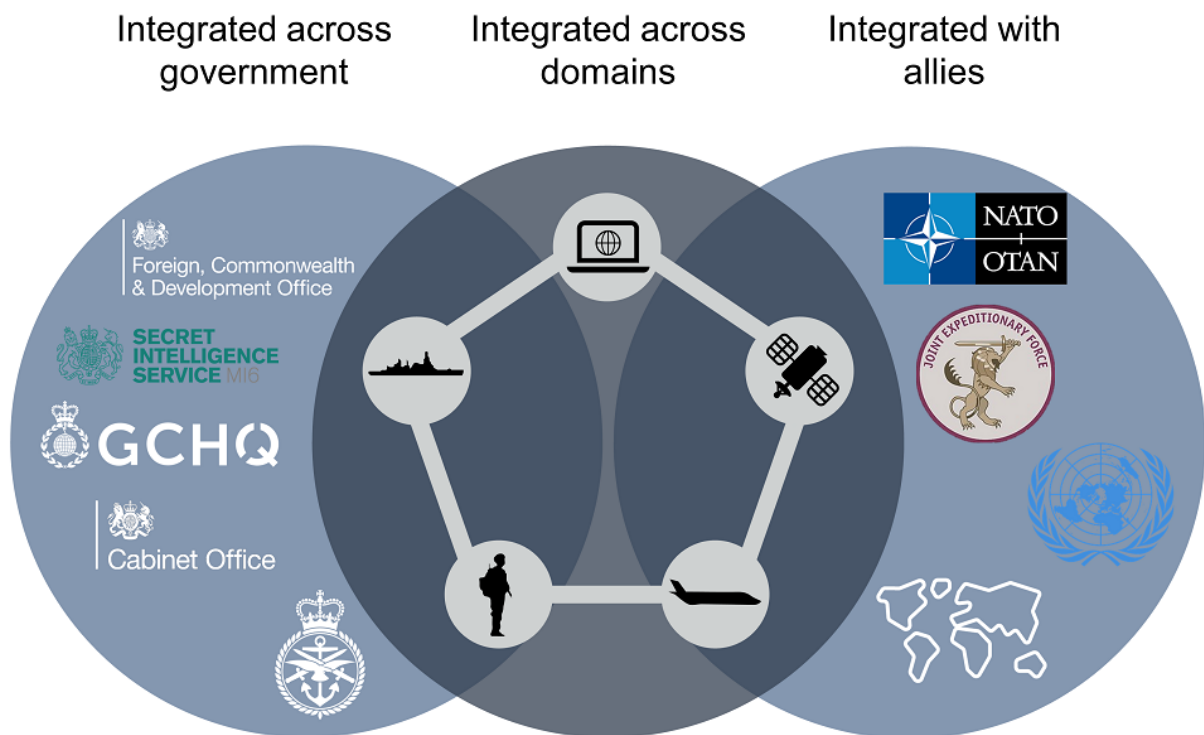
Figure 4: Multi domain integration. Credit UK MoD

At the same time, within the military instrument of power, it is an approach that resembles the one found in the US approach to MDO in a military sense, by orchestrating capabilities from across several domains against a single threat. While it is not phrased in exactly the same language as the US interpretation, the principal mechanism utilized appears to be the same. By using various avenues of attack, an unsolvable dilemma is created, as defending against, or defeating one vector opens one up against another, effectively tearing the opposing structure apart.

On the UK MoD website and in several of the referred UK publications this is visualized as shown below.
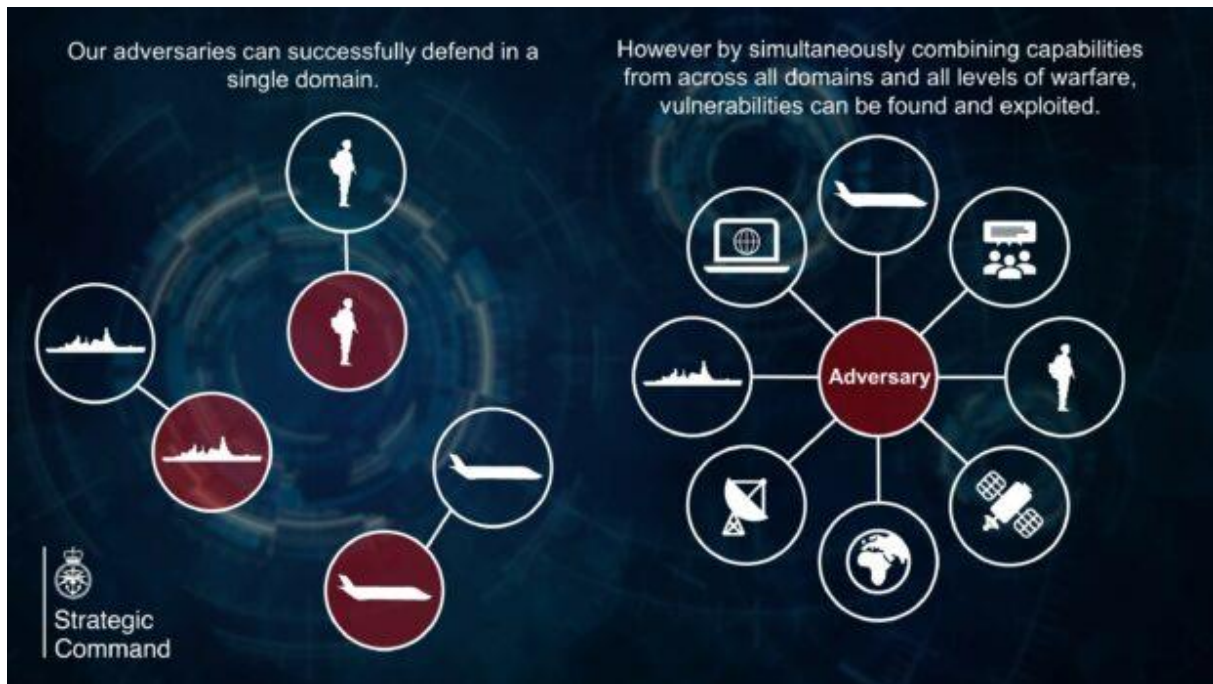
Figure 5: UK integrated approach within the military instrumnet, credit UK MoD

Returning the overarching concept, this approach builds on the concepts and thoughts put forward in the UK Integrated Operating Concept, which lays down a framework for the problem to be solved, among other things through MDI(Concepts and Doctrine Center Developments, 2021 p.5-8). As such, the UK construct operates at a different level of command than either the US or NATO concepts.

It does so by describing an environment in which the clear distinctions claimed to underpin the current ordering of war into distinct levels of command and the states instruments of power into discreet spheres no longer apply.(Concepts and Doctrine Center Developments, 2021 p.5-8) In such a interwoven and fluid environment, closer integration is required, both at a far lower level in the chain of command than what is the norm today, and across all aspects of government, indeed across society as a whole.(Concepts and Doctrine Center Developments, 2021p.5-8) In this regard, on a conceptual level, the UK concept encompasses a spectrum from whole of government integration to ad-hoc networked kill-chains at the sub-tactical level.

As seen earlier, In the US vocabulary the upper end of this orchestration scale belongs on the level of National Strategy, and a similar distinction can be found in NATO documents(NATO Standardisation Office, 2022a; J. C. o. Staff, 2018 p.I2-I4). From this it can be argued that there are at least two different perspectives on what makes up MDO. On the other hand, it may be that the UK interpretation of the term represents an attempt to get around the wicked problem of modern conflicts by equipping whoever is responsible for the campaign planning and execution with a more complete toolkit. Indeed,

the increased complexity of the modern battlespace, or rather arena of continuous competition, is listed as the official rationale for the concept by the UK MoD, and described as such in the Integrated Operating Concept. (Defence, 2022; Concepts and Doctrine Center Developments, 2021 p.3).

Simultaneously with the US TRADOC work leading up to the publication of one of the papers underpinning the army concept, titled: Multi- Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040 ((TRADOC), 2017), The UK MoD was attempting to frame the problem to be solved. This framing resulted in an updated Joint Doctrine Publication 04 in 2016, where the apparent changing nature of the environment in which armed conflict and other forms of competition between actors take place.(Concepts and Doctrine Centre Developments, 2016 p.18-25)

In seeking to absorb the lessons of over a decade of war against primarily non-stat actors only to be faced with a renewed era of interstate violence heralded by the Russian invasion of Ukraine in 2014, an increasingly complex operating environment emerges. Operating and succeeding in this environment would according to doctrine require a level of understanding and an integrated toolkit beyond the standards of industrialised warfare.(Concepts and Doctrine Centre Developments, 2016 p.18-25)

In this context, the UK development represents another branch of a general western reorientation of thought in the wake of the failures of conventional, industrial age warfare when faced with the so called wicked problem presented by the complex operating environment of the 21st century.(Smith, 2012) Thus, the UK MDI concept can be said to represent a different solution to the same problem, or set of related problems.

6.7. Comparison of concepts

To create a further analytical framework for answering the final parts of the research question, a systematic comparison of the different MDO concepts is required. The concepts will be compared along the lines discussed above. These lines are the primary level of command the concept is related to, the primary focus of the concept related to the states levers of power and if it is personnel, culture, or technology centric.

Concept	MDB/MDO (US)	MDO(NATO)	MDI
Level of Command	Operational	Strategic (mil)	Strategic (pol)
Levers of power	Military	Military	All
Focus	Technology	Technology/personnel	Personnel/culture
Origin	Army ops level	NATO	Ministry of Defence

Table 2: Comparison of concepts

As shown in the table, the three concepts have several subtle differences. Here it can be useful to refer to the adapted semiotic triangle described earlier with regards to analysing the domain term.
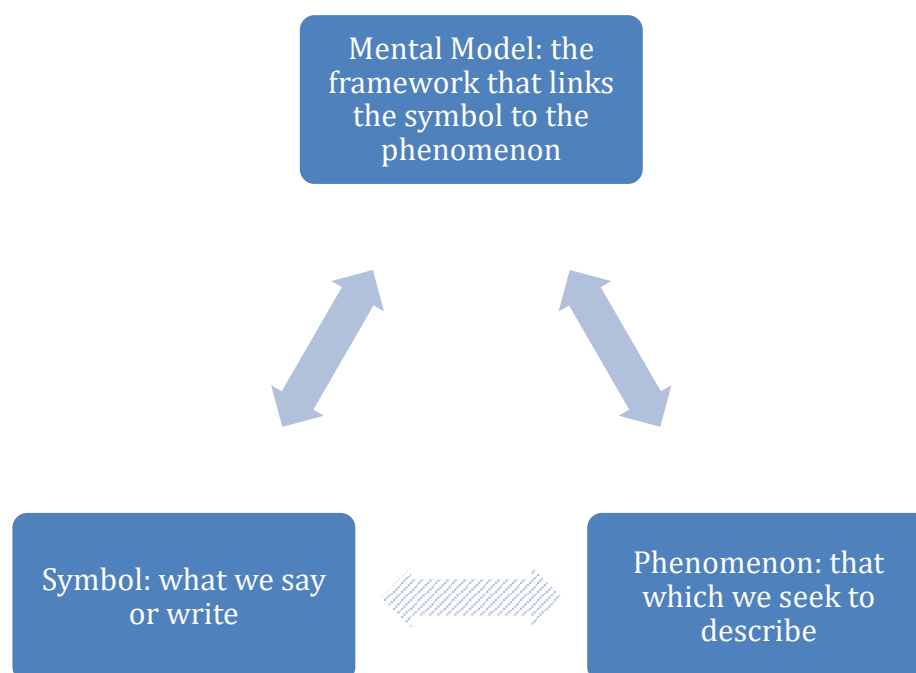

Figure 6: Adapted Semiotic Triangle

In the same manner as the domain term analysed earlier, when the different actors utilize the MDO concept/term as a symbol to describe a phenomenon, the connection is spurious at best without considering the mental model that links the two together. What we see from table 2 is that although the symbol utilized is the same (almost) in the form of MDO, the content of the mental models in the various organisations discussed differ significantly.

Acknowledging these various meanings and referents associated with a single symbol, be it domain or MDO, the circular solution model as described earlier can be applied to various variants of MDO. Here, the variation in content or meaning ascribed to the terms used in the formulation of the problem and its solutions, represent the various bands in the model that represents a transition from one

segmented layer to another. The final segmented layer in this case represents the various implementations of MDO in various nations and organisations.
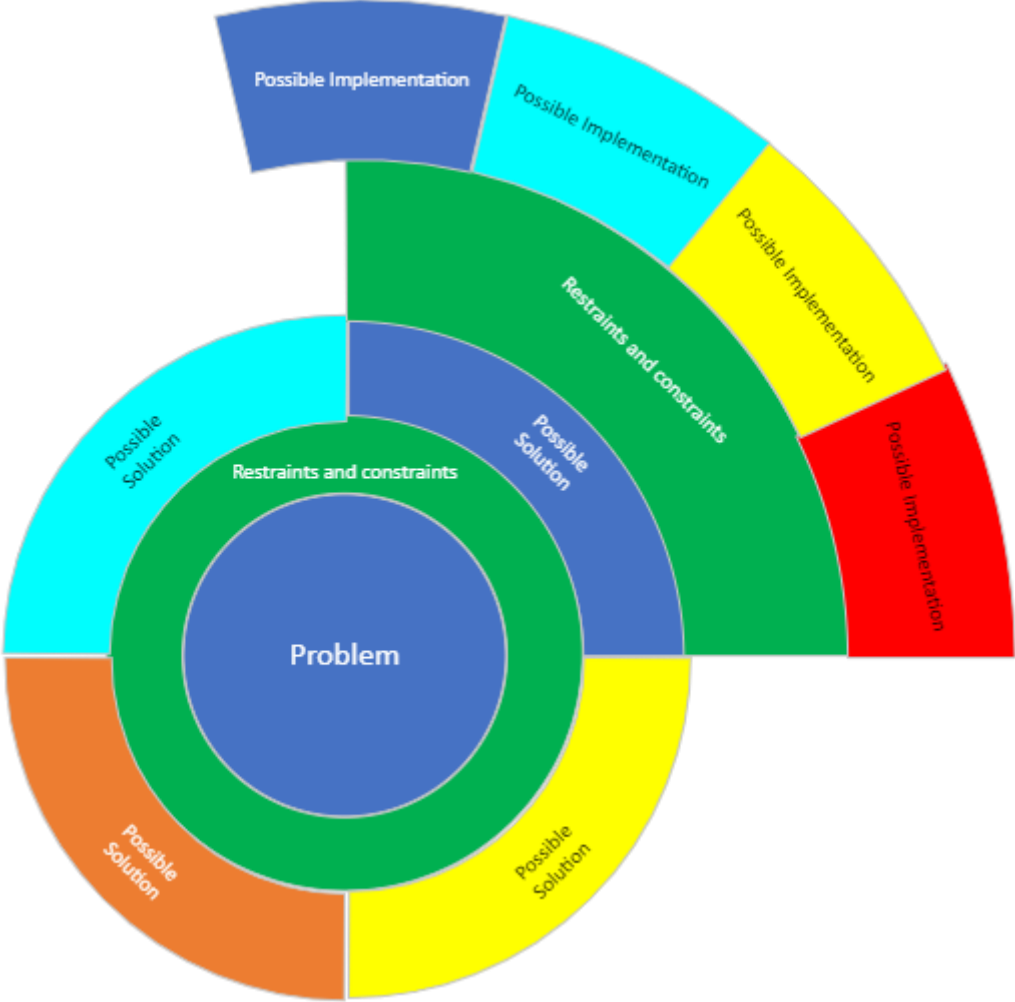

Figure 7 Circular understanding

The inner circle, labeled the Problem, represents the environment in which competition takes place, and success is desired. The first band represents the various restraints and constraint faced by the actor we are considering, including the understanding of the various symbols and concepts involved, hereunder the domain term and/or the MDO concept. Filtered through this band, a layer of possible solutions emerge. These solutions are then, filtered through a new band of restraints and constraints containing many of the same factors as previously, producing set of possible implementations.

In a reachback to the questions raised previously, what then happens when the various implementationsin the outer layer are labeled with the same symbol, and inferred to contain the same meaning pointing back at the same object or phenomenon?

6.8. Findings

From the facts, observations and indications uncovered above, we will now address the research questions of the thesis. The first research question was:

1. How is the term Domain understood in the current MDO debate?

   a. What, if any variation has there been in the understanding of the Domain concept since MDO was launched as a concept in 2017?

Findings and indications from the research process thus far can be used to argue in the following way. There appears to be no completely unitary understanding of the Domain term, even within the current debate on MDO. It can be argued that several normative efforts are under way, both with regards to the domain term itself, and which domains are utilised within military literature and on what terms. The main sources for these normative efforts appear to be NATO, the UK and various US military institutions and think tanks. However, it is worth noting that there is, despite significant similarities in proposed definition, no consensus among the parties listed above on how to define and understand a domain. So even if all the above normative efforts result in unitary definitions within their respective spheres, no unitary western definition or understanding is likely to result. Furthermore, either due to organisational inertia, uncertainty or other factors, there is also divergence within these organisations that can possibly hamper or completely derail the standardisation effort. As an example, while NATO has issued a preliminary MDO concept indicating an understanding of the domain term along the physical or territorial lines, the definitions found in the NATO Term database as of the time of writing are either connected to information infrastructure, or reflect a knowledge centred understanding akin to the Merriam-Webster one.(NATO, 2022; NATO Standardisation Office, 2022b)This makes it plausible to state that even within NATO, the understanding of the term, even in a operational frame of reference, is not unitary.

In addition, it appears that the understanding of both the domain term, and what constitutes a domain has varied since 2017 and the launch of MDO as a concept. One could argue that the vagueness of the term at the onset was a significant contributing factor spurring Heftye to try to clarify and define the term to add a logical consistency to the debate (Heftye, 2017). A second layer of variation comes with the discrepancy between the stated definitions and the apparent usage by practitioners and participants in the debate. As illustrated in the articles by Meadors and Parrot, (Meadors, 2022; Parrot, 2022) several other explicit or implicit interpretations and understandings of the domain term coexists. This is the case both in the official definitions and within the same timeframe. The cause of ambiguity can

either be unintentional, or it can be deliberate in order to fit a term into the line of reasoning being forwarder in the relevant piece. A broad categorisation of these various understanding and their possible implications for an understanding of various MDO concepts can be found in table 1 in the section on the domain term.

6.9. Axis of variation

This leads to another finding on the first research question. The variation in the understanding of the domain term is not linear with either time, geographic or organisational point of view. This thesis has been unable to establish a distinctly US, UK, or other working definition of the term, even though several publications within the various areas or polities present definitions. The foundation for this partial conclusion with regards to the problem comes from the variation in proposed or implied definition used within each geographical or political area.

Given that the spectrum of participants in the debate is as large as it is and the term not exclusive to the field, such a find is not unexpected. However, it underlines the importance of contextual knowledge about the piece in question when considering what its contribution to, and point of view on the debate is. It can, with a reasonable level of confidence, be argued that this will hold true for any debate with a certain number of participants, but it is nonetheless a find to be mindful of when a term is used in a way that implies universal understanding. Furthermore, this line of reasoning can be argued to lie at the heart of the semiotic triangle, meaning is governed by the concept linking the symbol to the referent. (McElvenny, 2018 p.18-24) An implied common understanding of a term used to build a conceptual construct can be misleading, creating false conclusions in an analysis based on the term. With regards to the use of the domain term in the MDO debate, this is problematic.

When constructing a concept based on several components without either a common understanding of said components or a clear, stated definition of the understanding of the basic components as they are used in the creation of the construct, the ability to precisely follow the logic of the construct is severely limited. Referring to the semiotic triangle again, this is creating a word or symbol for an object without understanding or stating the concept. From this it can be inferred that the possibility of a false linkage between the word and the object is significant, especially if several similar or equivalent words surround the same object because of different concepts, as illustrated in the circle sectors in figure 3

If the variation in understanding of the domain term does not vary in correlation with geographical location or political affiliation, then what other possible causes for variation can be found? A factor

that appears to covary with the definition or understanding of the domain term that is used, is the perspective in relations to the levels of command(NATO Standardization Office, 2021) utilized by the person applying the term. It appears that the further down towards a tactical perspective one moves, the more simplistic and mechanical the understanding of the domain term becomes. In its simplest form, the term appears understood simply as a vector along which an effect moves or a space it originates from. Sean Parrots article about the Multi-Domain reconnaissance troop appears to represent such a perspective(Parrot, 2022). At the other end of the spectrum can be found some of the more complex definitions, such as the one used by Donnelly and Farley in their 2018 article, or the one found in the UK Joint Concept Note 1/20 concerning MDO (Concepts and Doctrine Centre Developments, 2020 p.17-18) (J. Donnelly & Farley, 2018).

Concerning the perspective used by Donnelly and Farley, it can be argued that it remains unaltered with regards to the level of command used as a perspective. Such a statement requires one to accept that what physically or intellectually makes up a "*critical macro maneuver space*" change with the level from which it is viewed. In this case, the apparent variation in understanding and use of the term can be a case of the same phenomenon looking different based on the perspective of the viewer, rather than a variation in understanding of the term itself. However, for this to be a definitive explanation, then all users of the term from various points of view would have to subscribe to the same definition. Sufficient evidence for this has not been found in the material investigated by this thesis. That does not conclusively prove it a negative, and the possible correlation suggested above remains plausible, but significantly weakened by the lack of substantiating evidence.

On the other hand, no positive evidence for an intended correlation between level of command and understanding of the domain term has been found in the source material investigated either. This can be interpreted in several ways. One possible interpretation is that the understanding that content of the domain term changes in correlation with the perspective of the viewer is as implicit as the content of the term itself. Alternatively, the understanding of a potential link with perspective is as varying and unpronounced as the apparent content of the domain term itself. Or the link between content and level of command is but one of several variables influencing the understanding of the domain term in concert. At the current point, this thesis does not have enough data to conclude in either direction. This leaves the possible correlation between the understanding of the domain term and the level of command, or viewer perspective, as unresolved. However, this lack of a definitive conclusion, can be utilised to argue for an answer to the first research question regarding variation in understanding.

Following from this line of reasoning, this thesis finds that there has been and still is significant variation in the understanding of the domain term. The magnitude of this variation does not appear to

have diminished since the introduction of MDO as a concept in its MDB form in 2016/17. Furthermore, this thesis has been unable to conclusively prove any definitive causal relationship between the various forms of understanding and any geographical or organisational lines. Rather it appears to change with what usage or understanding of the term is perceived as most useful with regards to the construct one is trying to establish.

In relation to the concept of MDO, this makes it useful to consider several things when reading of or participating in the debate. As there appears to be no unified understanding as to what constitutes a domain, it follows that there cannot be a unified understanding of what Multi Domain Operations are. Even before going into how to define operations or what to read into the term multi, the fragmented state of understanding regarding the domain term as discussed above, makes unity unlikely. Following from this, any discussion of MDO, must not only account for the various standpoints of the author(s) of the piece in question, but also try to discern what interpretation of the domain term they are using, unless this is explicitly stated. Only by taking this additional variable into account, can a more accurate understanding of the reasoning put forward be achieved. That brings the discussion in the thesis to the next part of the research question

2. Is there a correlation in the understanding of the Domain term and the understanding of the MDO concept? Is there a causal link between the understanding of the term and the understanding of the concept? If so, what is the dependent and what is the independent variable?

As stated in the previous section, this thesis has not found a unitary, or even logically divided understanding of the domain term. Given that MDO as a concept is a construct that includes the domain term as a building block, this variation will impact the attributes of the construct in some manner. The degree and consequence of these variations are not equally apparent. From data in the examined sources, it can be established that several of the various interpretations of MDO utilize different understandings of the domain term. However, both the nature of a potential causal relationship between the construct and the term and determining dependent and independent variable requires further scrutiny.

Regarding the first part of the question, there exists relatively abundant data in the examined sources. Spanning from the UK approach at one end of the spectrum, presenting MDO as more of a whole of government enterprise, to the more workmanlike and tactically inclined publications from the US TRADOC, the expressions of MDO vary. Along the same lines, the interpretation of a domain varies from an artifact for use in creating a mental model in the UK approach, to a clearly physical space to

act in, through or from in the TRADOC expression. It appears that the more physical and concrete the domain term is envisaged, the more physical and concrete the MDO construct becomes.

From this, one can with a reasonable degree of confidence state that there is some correlation between the understanding of the domain term, and the understanding of MDO as a concept. However, a possible causality, can be argued both ways. A valid argument can be made that if the domain term is considered as universal or unitary, as discussed earlier, no need to produce a definition appears to participants in the MDO debate. When said participants then construct their take on MDO, they also implicitly imprint the needs and attributes of that concept on the domain term as used. This would make the domain term a dependent variable of the MDO concept as variously presented. If no sources felt compelled to give a definition of how they understood or used the domain term, then this explanation would be significantly strengthened.

This is not the case however, as several official publications, namely JCN 1/20 and several NATO publications actively list their own, divergent definitions of the term(Concepts and Doctrine Centre Developments, 2020 p.17-18; Operations, 2021 p.45). The existence of these definitions does not falsify the causality completely. It does, however, weaken it as an explanation and suggest that there might be other, competing, or complementary causal linkages at work.

However, it is also possible to find evidence supporting the inverse causal linkage. Based on the working definition a participant in the debate uses for the domain term, his or her interpretation of MDO as a concept is shaped by this. Such a linkage would make the understanding of MDO dependent on the domain definition being the independent variable. The article by Donnely and Farley indicates such a linkage, not explicitly, but by stating that there can be no progress in a debate concerning MDO until the community has established a common definition of the domain term(J. Donnelly & Farley, 2018). From a purely logical point of view, it is hard to disagree with this position, if MDO is understood as a construct with the domain term as a key building block.

This understanding of MDO is in line with the way it is depicted in much of the US debate taking place within and between the armed services. In this context, the definition and understanding of the domain appears to be an important premise for who has ownership of a certain capability or concept. The ability to shape a definition of the term in such a way as to enable alignment with existing organisational lines appears to matter a great deal. Attaching ownership of a domain is often used to argue for an interpretation of MDO in which the role of a certain organisation is preeminent based off said ownership. In that respect the understanding of both term and construct can be argued to represent an expression of turfism, or an organisational silo.(Fenwick et al., 2009 p.4-5)

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However, if one begins from the UK position as put forward in JCN 1-20, that "*The aim in MDI is not to use as many domains as possible",* but rather to be able to create effects in an operating environment through integrating various effects. (Concepts and Doctrine Centre Developments, 2020 p.42-47) Following this line of reasoning, it can be argued that the exact nature and makeup of the domains themselves is of secondary importance. The domains are merely mental constructs to aid in systematizing a practitioners thoughts to facilitate lateral thinking about which effects can be brought to bear simultaneously, creating the greatest effect on "*audiences, actors, adversaries and enemies (A3E)"* (Concepts and Doctrine Centre Developments, 2020 p.48-49).

These two positions form near opposite ends of a spectrum regarding direction of cause and effect in a possible causal relationship between understanding of the domain term and understanding of MDO. Focussing on the second part of the question it becomes clear from the available data that there is a correlation between the understanding of the domain term and the understanding of MDO. However, as illustrated above, if this correlation represents causality is not determined with any degree of confidence. Categorising the various possible expressions of the relationship, three broad categories can be established.

1. The understanding of the domain term is given by how one understands MDO as something beyond joint, and perhaps beyond military. How the domain term is understood is merely a mental tool to order one's thoughts. The domain term is the dependent variable.
2. The understanding of MDO is to a large degree defined by how one understands the domain term. Building a construct such as MDO is dependent on the understanding of the respective building blocks. The MDO concept is the dependent variable.
3. Both the understanding of the domain term and the understanding of MDO as a concept is (co)variable with which level of command, from tactical through to strategic one is primarily framing the debate within. The correlation between the term and the concept does not imply causality.

From this breakdown in categories, the second part of the second research question might be answered in the following manner. Yes, there appears to be a strong correlation between the understanding of the domain term, implicit or explicit. However, the evidence in the investigated sources diverge in several directions as described above when it comes to determining a possible causal link and identifying a dependent and one or more independent variables.

This does not falsify the possible presence of a causal link. It merely indicates that the nature of said link will vary depending on the perspective of the author of the piece in question. Furthermore, since

there appears to be a strong indication in the data that MDO is considered a form of construct or concept made up of several building blocks, some form of correlation and causality between building blocks and overarching concept is to be expected. The nature of said relationship however must be interpreted from the specific context of the discussion. In many cases the understanding of the relationship is not explicitly stated by the source itself. It must instead be extrapolated from the structure of the text, its arguments and point of view.

Based on the considerations of the two first research questions, it is now possible to address the third and final part of the research question

3. How can these relations, and their attendant understandings of MDO, affect small and medium states, with Norway as an example?

Summing up the findings from the two previous questions, the following will be taken as a baseline for the discussion. Within the debate concerning MDO there exists a significant variation in understanding of the domain term, that is not overlapping with geography, organisational structure, or chronology. In addition, beyond observing a correlation between the understanding of the domain term and the understanding of MDO as a concept, the nature of the correlation and a possible causal link varies to a similar degree as the understanding of the domain term itself.

From this starting point, some effects on a Norwegian perspective on MDO development can be ascertained. Firstly, as a small, alliance dependent state, Norway has a history of largely adopting US or NATO ideas or concepts without large degrees of national adaptation(Høiback, 2012). If the concept or doctrine in question is well established and universally understood in a similar fashion, and developed for an applicable context, this does not pose any significant challenges. When applying parts of, or the entire concept to achieve a desired effect, or when requested to do so by allies, given the caveats above, all parties involved share a similar understanding as to the expected inputs required and result achieved.

On the other hand, regardless of the aim to be achieved by the implementation of a concept or a doctrine, be it learning, cultural change or providing leadership guidance(Andersen, 2016 p.15-16; Høiback, 2012 p.396), in a situation where the understanding of what is actually being implemented is more uncertain, unintended divergence can be created. To exemplify, if one from a Norwegian perspective understands MDO form a perspective resembling the US Army approach, which builds on the legacy of Joint operations and as a purely military concept, this puts forward one set of demands on the Norwegian armed forces if they are to adapt.

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Adopting an understanding closer to the UK MDI concept with is much greater emphasis on a whole of government approach on the other hand will present a different set of demands on the armed forces and society in general. Should Norway use its resources to produce a high-tech defence force capable of seamlessly integrating with a US and a few other select allies, or a less advanced force risking a second-tier status? Or should a larger portion be allocated to planning and preparation for the continuous employment of all national assets, state or private in a continuous competition? Perhaps the revitalized total defence concept(Sellevåg, 2022) represents a Norwegian understanding of MDO/MDI put into practice?

The answer to these questions to a large extent depend upon the understanding of what MDO is that is used as a frame of reference for considering them. This thesis does not claim to answer the structure question. Instead, it aims to clarify to a certain degree how the width of different interpretations of MDO as a concept can result in different and sometimes mutually exclusive versions of how Norway and other small states should align themselves in order to maximize collective security. Creating armed forces that are capable of integrating directly into the sort of high-tech and advanced force envisaged in US policy at the highest level (Biden, 2022 p.14-15; Trump, 2017 p.25-32), is a costly process. The resource expenditure involved may for many small and medium sized countries force a abandonment of a complete military structure, focussing instead on a select few capabilities(Kjetil Hove, 2017 p.13-14).

Deciding which of these approaches to pursue, either exclusively or in a combination is clearly a political decision. However, any decision is built on some sort of conceptual foundation, and in this regard, the prevailing understanding of the possible options and their implications will impact the decision. To exemplify, a government being informed by an understanding of MDO in line with the UK approach, can choose to focus on the other instruments of national power(J. C. o. Staff, 2018 p.I1-I3) combined with a more low tech and/or low cost military structure("The Melians' revenge," 2019). With regards to the arguments made earlier with regards to concept understanding based on level of command, this can affect the implementation of a small state adaptation of MDO as well. If MDO is understood from a strategic point of view, then it can be argued along the lines proposed by Edward Luttwak, that a radical, technological rebuild of ones armed forces does not automatically follow(Luttwak, 2001). Following this line of reasoning, which in its effects correlates to a large degree with the perspectives put forward in considering MDI rather than MDO, then it is more imperative for a small to medium sized state to have a holistic approach to all its instruments of power.

Security or success in continuous competition in this paradigm goes to those actors willing to accept the inversion of logic between the political-strategic level utilizing all instruments of power, and the

military-strategic level accepting risk and uncertainty to function optimally as one of those instruments (Luttwak, 2001). Using Norway as an example, following this line of reasoning could lead to a military structure optimized for territorial defence with less sophisticated equipment. Within the realm of military strategy this represents an acceptance of the risk attached by presenting an asymmetry to a potential adversary. This would build on an assumption that it is possible to undermine the technological edge of an opponent through clever use of available resources. Furthermore, this approach relies on the remaining instruments of power to provide a situation that enables the military instrument to function within an environment where the technological deficiencies as described above can be mitigated.

On the other end of the spectrum from this approach, one can choose to use the perspective held out in various US publications. A key point in the US discourse is the maintenance or reestablishment of overmatch, including technological overmatch. And in those cases where overmatch cannot be established, then asymmetries are to be produced technologically(Headquarters, 2019 p.1_1-2; Tony, 2015).

True, it is not always explicitly stated that technology is the preferred answer, but it can be argued that the focus on potential adversaries ability to contest domains as they appear to be understood by the publications indicates a technology focus (Headquarters, 2019 p.1_1-2). Additional weight is lent to this line of reasoning by the level of concern apparent in the debate surrounding the relative technological prowess of the US and China.(Project, 2022 p.30-39) Furthermore, the amount of focus given to the implications of cyber/EW and the compression of the battlespace also appears to support the understood importance of a technological edge.

If a small or medium state should align itself with this understanding of the concept, then a costly and necessarily small armed force as mentioned above would be a probable outcome. Given the available resources for defence, this would for many states necessitate a choice concerning which parts of an armed force, or what niche capabilities should be maintained at the necessary level of technological excellence.(Kjetil Hove, 2017 p.13-14) In addition, if the accelerating rate of technological change is seen in combination with the expected in-service life of military equipment, then this dilemma will only become more salient unless a break or disruption in the current trends occur. The usage of the other instruments of power in this scenario would primarily entail positioning the state in such a manner as to ensure the aid of another state or alliance to plug select components into a complete military apparatus.

The possible options above do not represent a binary choice, nor are they thoroughly worked through scenarios. They merely represent the possible implications of different understandings of what MDO

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as a concept entails when it comes to the manoeuvre space available to small and medium states. From the discussion and options outlined, it is now possible to answer the third part of the research question.

How can these relations, and their attendant understandings of MDO, affect small and medium states, with Norway as an example?

In short, the effect depends on the understanding that prevails, both within the state in question, and in the allies and partners it most closely interacts with. Depending on the understanding, an adaptation to MDO can become either a political-strategic problem, a military-technological problem, or an organisational problem for the operational level of command, or a combination of all the above.

As such, the understanding of MDO is no different from other constructs, in that the understanding and framing of the nature of the problem to a large degree will dictate the general shape of any solution or adaptation. What is less general but applies to an adaptation to MDO for small and medium states is that certain of the possible solutions will require an even greater adaptation to and integration with one or more major powers than what is the regular lot of minor players in the current international relations.

Operating with a heightened level of integration brings with it several potential consequences. First off, the dependence is not completely a one-way street. Even in current US writing, the weight given to integration with partners, bringing them into the Joint Force, is given considerable weight, from the political-strategic level down(Biden, 2022 p.8-10; Staff, 2017 p.I11). From this relationship of mutual if not symmetrical dependence several mechanisms can come in to play.

From the Norwegian perspective, as a small state, the fear of abandonment by a larger ally is always present in some form(Heier, 2019; Snyder, 1984) . If an understanding of MDO demanding niche capabilities and a large degree of integration with said ally or alliance is adopted, then the fear of abandonment is likely to increase, as the minor state's ability to provide its own security outside the alliance is diminished by the incomplete nature of the security structure of the state.

On the other hand, as it is stressed in several publications, the speed of technological change combined with the overall balance of power between the major actors in the international system means that the largest party in the coalition can no longer be as cavalier with the participation of the minor partners. To exemplify one may examine the balance of power between the US and China. Even given the ongoing debate about just how one measures the power of a nation with regards to what factors to include (Beckley, 2018; Tunsjø, 2018), the balance is becoming close enough that the contribution of coalition partners not in the same league as the major players might make a meaningful difference.

This is contrary to classical theory on interdependency in alliances with a large difference in relative power between the participants. Furthermore, the references to the importance of partners found in US and NATO documents might primarily be for political consumption rather than reflecting practical reality. On the other hand, the evolving understanding of the way power and the ability to cause meaningful harm is distributed can lead to an increased importance of the contribution of even minor actors.

This line of reasoning might allay the fear of abandonment from a small state perspective, while at the same time increase the likelihood of entrapment, that is the small state pulling the larger party into a conflict not in their interest. On the other hand, if the larger actor is aware of the risk of entrapment and requires some or all the capabilities of the smaller ally, then it might lead the larger party to act proactively. In the Norwegian example, one can argue that the increased activity by both US, UK and French warships and aircraft in the arctic regions in close vicinity to Norwegian areas of interest, represent proactive measures taken in the absence of capability on the part of Norway. (Østhagen, 2023 p.60-76) Such filling of an apparent vacuum is likely to increase the more niche the security structure of a state becomes.

Choosing the operating understanding of what MDO is will probably influence Norwegian policy on several levels. The levels influenced and can vary along the lines outlined above, with the attendant possible implications for the ability of Norway to provide security for itself and the room it has for manoeuvre. On the other hand, due to the large variety in possible interpretation and understanding as partially outlined in part two of the research question, the final interpretation of MDO and its impact on the policy and security situation of a small state such as Norway cannot be fully described, nor predicted within the boundaries of this thesis.

What can be stated is that for any small state, the perspectives on security and the usages of military power adopted by major allies will affect the policy of the small state. When these perspectives appear unclear and possibly contradictory, either within a major power, or among several of the larger states in the alliance one is affiliated with, then the choice of adaptation becomes challenging. This is especially true in this case when the various interpretations diverge as significantly as they appear to do in this case. Thus, the effect of the various interpretations on Norway and Norwegian security policy is to add an additional level of insecurity an ambiguity.

7. Conclusion
7.1. The domain term
As seen in the description of the findings in the various source material, there does not appear to exist a truly unitary understanding of the domain term as used within military or security circles. This is despite several of the publications studied including glossaries and lists of terms and definitions that in some cases include the domain term. Even in the presence of such definitions from an actor or organisation, the source material from within the organisation or polity issuing the definition does not uniformly follow the issued definition.

Furthermore, the variations in usage of the term does not appear to correlate with variation in either geography, time, or political affiliation.

Based on these observations, it is not possible to point out a single or even a few main lines of development for the understanding of the domain term within the debate concerning MDO as a concept from its apparent origin around 2016. The implications of this divergence in term understanding again varies based on how the relationship between the term and the concept is understood by both the sender and the recipient of the message. This is a divergence from what direct arguments can be found concerning the theme, as they instead argue for a unitary understanding of the term based off a common definition which can then be used to construct a concept. This also signals an understanding of the causal link from the term to the concept and not the other way around. However, this direct and stated causality is the exception rather than the norm.

7.2. The term related to the concept
Based on the widely divergent understanding of the domain term, establishing a possible causal relationship between the understanding of the domain term and the interpretation of MDO as a concept proved challenging. Three different possible categories of causal links were found between the two initial variables, the term, and the concept, and a third possible variable introduced based on the observations made from available source material. In several sources, the interpretation of both the domain term and MDO as a concept appears to be govern by the level of command one is discussing, be it tactical, operational, or strategic. From these observations, the discussed level of command was introduced as a variable, giving three possible dependent/independent variables.

In line with the observations from the investigation into the differing understandings of the domain term, no definitive causal link can be established. Rather, three main categories of causal links present themselves in the data. As shown earlier, these are:

1. The understanding of the domain term is given by how one understands MDO as something beyond joint, and perhaps beyond military. How the domain term is understood is merely a mental tool to order ones thoughts.

2. The understanding of MDO is to a large degree defined by how one understands the domain term. Building a construct such as MDO is dependent on the understanding of the respective building blocks.

3. Both the understanding of the domain term and the understanding of MDO as a concept is (co)variable with which level of command, from tactical through to strategic one is primarily framing the debate within.

In the same manner as with the domain term itself, arriving at a unitary causality is possible, but the viability of this is also uncertain given the large number of independent actors involved in the debate. At best, this study indicates that an awareness of one's own and the author of the message in questions working causal relationship will enable a discussion where there is a lessened risk of conceptual misunderstanding.

Reducing the risk of misunderstanding or misinterpreting the various relationships and definitions used in this debate is a quite common risk given the number of varying approaches to MDO as a concept found in the source material. From purely military, almost technical considerations to loftier whole of government discussions, the span in theme for the discussion is such as to make unitary causalities and definitions unlikely. In part this stems from the fact that is pointed out in UK literature, that all the variables listed above are one form or another of mental constructs, taking on the shape and meaning according to the context and how the user structures his or her mental models.

Also, given the fundamental differences between the various categories of understanding of the domain term, their usage will impact how the understanding of MDO as a concept is angled, tilting it in a spectrum from the concrete and purely military to an abstract mental model for society as a whole.

7.3. MDO and its implications

Consideration of the various interpretations of the MDO concept and the different outputs they would create, is the takeaway from the two first research questions that carries over to the last. To describe the effects of concept and its implications on a state in a certain system, the nature of the concept and the boundaries of the system should first be ascertained.

In this case however, the data shows that both the nature of the concept in question (MDO) and the system boundaries, from military-tactical to whole of government policy, defies unitary description. That provides a situation in which the effect on small states such as for example Norway cannot be described in the singular, that is, at least not the effect of the concept itself. On the other hand, the ambiguity provided by the span in possible interpretations is a significant find with regards to the debate

As discussed earlier, most states and especially small states, have both limited freedom of manoeuvre with regards to their alignment and limited resources to dedicate to defence. This makes a surfeit of potentially mutually exclusive choices a challenge, just as much as understanding what a particular concept is in a particular context. In this regard, the apparent divergence between the primary US (Army) centred interpretation of MDO and the UK whole of government approach within the framework of an emerging NATO concept, is of concern to Norway. As the alliance grows, creating the potential for extended decision cycles, and response times apparently growing shorter, a regionalisation is taking place, with localized networks within the alliance stepping up as the most likely initial source of a security guarantee. But how is Norway to adapt to, or align its defence and security policy if the concepts and debate informing this alignment diverges to the degree that it appears to do in the triangle UK-US-NATO? Aligning with one of the interpretations is mutually exclusive with alignment with the others, increasing the divergence from these positions. Unfortunately, the consequences of said divergence cannot be ascertained before a stress-test of the adapted structure is conducted.
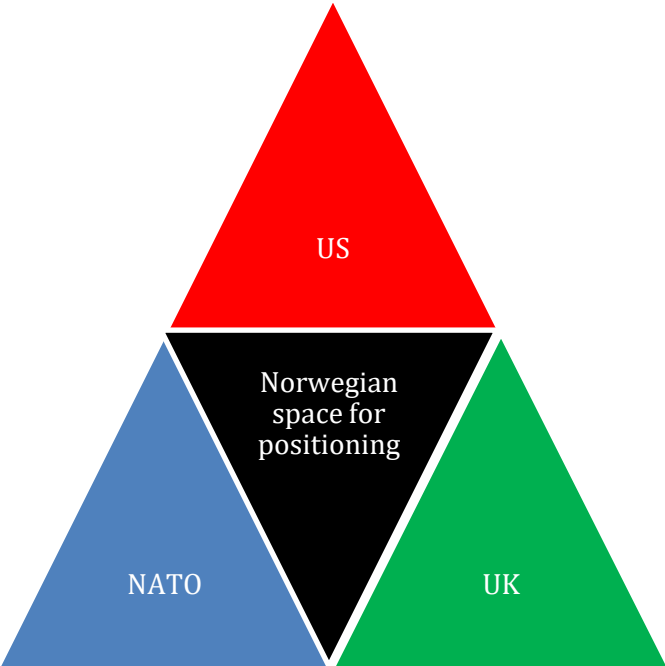

Figure 8 MDO positioning triangle

A possible mitigating course of action is to be aware of the different causal links and perspectives underlying the various apparent outcomes and positions. As shown earlier, if one considers the differing perspectives of the various positions, then it is possible to construct a coherent mental model that unifies the different models and concepts not in a single point, but along a spectrum, thus positioning in a way that is not utterly incompatible with any position, and aware of the distance to each in case of realignment becoming necessary. The challenge lies in recognizing how the necessities of one concept relates to and interacts with another rather than necessarily compete.

8. Postscript

Normally, a thesis should be completed once the conclusion is reached and the narrative wrapped up nicely. As it stands, this can be argued to be the case. However, since the subject of the thesis is rooted in an ongoing debate new articles and publications with variable degrees of relevance have continually been published throughout the research process. At some point the selection of source material to include in the thesis must be finalised in order to progress to analysis.

This is not exclusive or particular to this thesis or this subject matter. However, given that one strand of investigation was the variance in interpretation of MDO as a concept, it provides useful context regarding the actual and evolving level of variation present. It also acknowledges that it will even as this thesis is being completed, be possible to find potentially significant, even primary sources that are not included, or could alter the balance of the discourse in the thesis.

In addition, one can also find discussions about the actual impact of any given term or concept within military strategy, does it impart meaning, or is it all just buzzwords peddled for signalling?(Benson & Greer, 2023) If this is the case for MDO or not, is beyond the scope of what this thesis has tried to investigate. It is however worth noting that several points have been made about the similarity of MDO to several different concept, namely AirLand battle, that matured to a doctrine, and Network Centric Warfare, that appears to have faded from the discourse without leaving a permanent mark in current doctrine. The key takeaway however is an awareness that the actual impact and meaning of a concept or a doctrine, including its longevity cannot be determined from the amount of published material nor who champions it.

Despite this somewhat relativistic view on the coherence of the narrative one can produce from a continually changing research landscape, it is still possible to add value by research and investigation. Primarily this is done through exploring various perspectives and possible causal linkages, enabling a more coherent appreciation of the reasoning put forward from various perspectives. Secondarily, it also aids in crafting a more coherent conceptual construct, as it highlights and makes visible at least some parts of the concept used to link the semiotic referent and its symbol.

From this, perhaps, the generalisation value in this thesis can be created. Not a generalisation to other doctrinal debates or specific military-theoretic fields, but rather a consideration of the level of divergence possible within any given debate if one or more of the key aspects are not fully understood or clearly defined. In that case, this case study into a single term making up part of a single concept can add perspective beyond this isolated debate or topic.

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Appendix 1 Alternate web of meaning