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Some Principles of Information Strategy:

A Corbettian approach in today's security environment

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The United States lacks a national-level information strategy. This paper examines an approach to developing a model for a national information strategy based on the theories and principles of Sir Julian Corbett. This examination focuses on Corbett's emphasis on the importance of theoretical underpinnings for strategy by proposing new definitions for information, knowledge, and data. It also highlights Corbett's relevance because of the many parallels between the maritime and information environments. Lastly, the paper applies Corbett's tenets of sea control within the information environment to derive a recommended model for a national information strategy.

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Paper Abstract

The United States lacks a national-level information strategy. In recent years, concern has grown in U.S. military and civilian circles that the country is ill-equipped to negotiate the diffusion of power within the information environment. The Defense enterprise has taken numerous actions to remedy this problem in the last five years, yet no longer has a clear definition of what information even is. This paper examines an approach to developing a model for a national information strategy based on the theories and principles of Sir Julian Corbett. This examination focuses on Corbett's emphasis on the importance of theoretical underpinnings for strategy by proposing new definitions for information, knowledge, and data. It also highlights Corbett's relevance because of the many parallels between the maritime and information environments. Lastly, the paper applies Corbett's tenets of sea control within the information environment to derive a recommended model for a national information strategy.

INTRODUCTION

The events of this year illustrate that a national information strategy is needed now more than ever. Amid the COVID-19 pandemic, the Chinese government has gone to great lengths to present itself as a leader on the global stage. Its "Health Silk Road" has already deployed to Italy, Serbia, and Hungary.[i] At the same time, Chinese propaganda is spreading "foggy and contradictory theories" over the origins of the virus.[ii] It is a blend of international aid and information warfare. The Congressional Research Service took note of this aspect of Chinese strategy in its March 2018 report. Among other things, the Chinese concept of "Unrestricted Warfare" combines elements of information operations and foreign relations to create "cognitive errors" and influence the thinking of the adversary.[iii] There is a well-defined Chinese strategy, and international audiences are listening.

By contrast, the United States has not presented a cohesive approach. On 26 March, the G-20 conducted a virtual summit. Despite heading the global response to the 2008 economic crisis and the 2014 Ebola epidemic, the United States declined the opportunity for COVID-19.[iv] The message in forums like the G-20 is not about global cooperation. Accusations and recriminations characterize the response to the Chinese up to this point. Yet, the situation is rife with the opportunity to both cooperate and compete. Crafting a clear national information strategy will help in the challenges of today and those yet to come. The naval tradition offers a promising model for creating one.

Sir Julian Corbett's theory of maritime strategy and sea control provides a critical prototype for the development of a national information strategy. His work is profound and relevant for several reasons. The emphasis on the importance of theoretical underpinnings, the

parallels between the maritime and information environments, and his tenets of sea control all coalesce to present a valuable blueprint for a U.S. information strategy.

BACKGROUND

In June 2016, the Department of Defense released the *Strategy for Operations in the Information Environment (SOIE)*. This document was, in part, a response to the FY 2014 National Defense Authorization Act (NDAA) requirement for an information operations strategy. Firmly rooted in the 2015 National Security Strategy, Former Secretary Ash Carter set out to align Departmental actions and set the conditions for DoD operations in the information environment.[v] The 2016 SOIE outlines four lines of effort (people, programs, policies, and partnerships) as well as nine ways for the Department to be better prepared to "gain and sustain military advantage in the IE."[vi] This document has offered a foundation for the Defense Department's renewed outlook on the information environment.

In July 2017, the Chairmen of the Joint Chiefs of Staff announced a revision to joint doctrine and introduced information as the seventh joint function. As Former Secretary Mattes stated in his September 2017 endorsement of the change to JP 1, the new joint function "signals a fundamental appreciation for the military role of information at the strategic, operational, and tactical levels within today's complex operating environment."[vii] The change was no small gesture. As adversaries, competitors, partners, and domestic players alike became more adept at functioning in a more connected world, the U.S. military needed decisive action to keep pace.

The year 2018 witnessed the most decisive action to date. The National Defense Strategy characterized "information superiority" as a critical supporter in the effort to "achieve peace through strength."[viii] Additionally, the Joint Staff published the *Joint Concept for Operating in the Information Environment (JCOIE)* as an output of the 2016 SOIE lines of effort. The concept

document sets out to describe how the Joint Force "will build information into operational art to design operations that deliberately leverage information and the informational aspects of military activities to achieve enduring strategic outcomes."[ix] Both of these 2018 contributions defined a security environment, "the sum of all operating environments," in which the U.S. military advantage was at risk. The NDS sounded the call for a Joint Force with a deepened understanding of information and its complex impacts.

The drive for "information superiority" has given rise to service policy as well. In February 2020, the Department of the Navy issued its *Information Superiority Vision*. Former Secretary Modly outlined an information management approach focused on three lines of effort: modernize, innovate, and defend. All these actions are in a bid to get "the right information in the right hands, ready to decide, act, and fight."[x] There is no question that the 2017 decision to elevate information to a joint function has made its mark. The Joint Staff and the services realize the strategic importance of this change.

Though the military sector has made considerable progress over the past five years, the United States still lacks a national information strategy. The Congressional Research Service raised this issue to Congress in a report last updated in March 2018. The report aims to clarify terminology and to draw attention to the information warfare strategies of U.S. adversaries and competitors. It also raises a few crucial issues and questions. The preponderance of information warfare doctrine and capability exists only within the U.S. military.[xi] The agency formerly responsible for supporting U.S. national interests abroad through information dissemination, the U.S. Information Agency (USIA), no longer exists. Lastly, the report poses the question of "whether the U.S. government has institutions, organization, and programs to wage and win an

information war or to deter foreign information operations."[xii] The military is attempting to answer this question but does not have a national strategy to guide it.

There are barriers to a coherent information strategy within the military enterprise as well. Though there are many joint publications, joint concepts, and service doctrine about information operations, there is no working definition of "information" within current military writing. The Joint Staff first published the current Joint Publication 3-13 *Information Operations* in 2012. It defined information as "data in context to inform or provide meaning for action."[xiii] This same publication has since removed the term "data" from the glossary, and the current DOD Dictionary of Military and Associated Terms no longer contains a definition for information.[xiv] Ambiguity in terminology creates confusion at all levels. Information as a joint function is defined while the concept of information remains vague.

As a result, none of the current military documents amount to a national information strategy. The 2016 SOIE and the 2018 JCOIE are organizational management strategies. They each offer a vivid picture of the environment in which the military must now operate. Each also addresses the composition, training, and policies of the future force. As Major Janoe states in his article "The Changing Face of Warfare," a national strategy is needed to "inform a whole-of-government approach that respects our national values while addressing growing threats to our national security."[xv] While the elevation of information as a joint function is an important step, it merely serves to integrate military actions.

THE IMPORTANCE OF THEORY

The current U.S. approach to information and information operations lacks Corbett's focus on theoretical underpinnings. Sir Corbett turned to theory for reasons that still merit today.

The use of theory offers a process to coordinate ideas, serves as a basis for practical discussion, and finally generates common understanding.

A theory provides the vehicle for defining terms, relationships, and factors. As Corbett looked at the theoretical study of war in hopes that it might aid in the development of maritime strategy, he made some critical assertions. He stated that finding and exposing the agreed-upon foundational principles was the "remedy for loose and purposeless discussion."[xvi] As Corbett examined the maritime domain, this meant generating a consensus on the theoretical imperatives of naval power amongst British strategists. Clear concepts and coordinated ideas do not simplify problems. Corbett did not believe that obtaining discipline in the academic approach to naval power made the employment of the British fleet any easier. Instead, widely accepted terminology, definitions, and the like set the conditions for practical discussion and deliberation.

The theoretical study adds depth to debates. Through deliberation, planners and leaders decide what theoretical aspects best apply to the real-world problem set. Corbett states that without a clear academic consensus, "most deliberations are merely verbal contentions which rest on no firm foundation…"[xvii] People tend to walk away from these sorts of discussions more firmly entrenched in the opinion they had before the debate began. Higher quality solutions emerge when problem-solving and the development of an operational approach start from a common theoretical foundation. The employment of information deserves the same rigor. Individual and biased conceptions of information power waste time that strategists require to develop a path forward.

A common understanding and common vernacular arise from Corbett's view of practical deliberation. Planners and leaders use these tools to communicate the operational approach to a problem set to subordinates and superiors. With the use of universal terms, definitions, and

language, Corbett's vision of "mental solidarity"[xviii] is achievable. A lack of theory risks a situation in which both officers and statesmen are "unable to decide on a coherent plan of war from inability to analyse scientifically the situation they had to face…"[xix] There is no need to walk blindly in the study of information. Errors will always exist in developing a strategy, but an academic basis can help to reduce them.

An information theory that prioritizes the generation and proliferation of knowledge provides a balanced viewpoint that is ready for Corbett's practical deliberation. Information theory is a continuously growing field encompassing aspects of philosophy, information systems, computer science, and information technologies. As the editor of a compilation of U.S. Naval Postgraduate School Contemporary Security Studies essays in 2007, Professor John Arquilla recognized the need for an information strategy to parallel traditional military strategy. He remarks that an information strategy is a tool of statecraft that not only requires theoretical underpinnings but must emphasize an understanding of the "kind of knowledge that needs to be created[xx]." Information strategy must also be wary of an "undue focus on technology" and instead empowering the discipline of information operations as both the creator and protector of content.[xxi] These criteria help point to some talented theorists in this ever-expanding field of study.

In 2017, John Mingers and Craig Standing published an instrumental theory of information that gives precision to the entire concept. After researching and selecting various information theories spanning the last century, the two professors presented their viewpoints. In their estimation, information is both objective and veridical.[xxii] They characterized the concept of objectivity as "the information carried by signs and messages exists independently of its receivers or observers."[xxiii] In other words, the existence of information does not depend on

human interaction. By veridical, the authors make it clear that this theory does not view false information as information. Information by its nature is "truth-constituted."[xxiv] These two conceptual pillars make definitions and relationships between terms clearer.

Mingers and Standing proposed a general definition of information that allows it to pertain to both signs in the natural world as well as messages within the human social context. The researchers define information as "the propositional content of signs."[xxv] These signs equate to four different levels of information. The first is the environmental or physical level. The next is the syntactic level. Signs at this level involve some sort of coding as in a map or a measuring tool. The third level is the semantic level, where signs are purely symbolic. Language resides at this level. Lastly, human interaction is an example of the pragmatic level of information. Speech acts, conversations and written communications involve not only syntax and semantics, but also comprehensibility, sincerity, and social rightness.[xxvi] This concept illustrates that human interfaces are incredibly complex and convey not only factual matters but also reveal information about the intentions of the speaker.[xxvii] The flexibility of this definition and the four levels becomes evident when combined with the notion of information as objective and veridical.

A sign, be it environmental, for instance, a tree, or human-produced, such as a written report, carries information. It does not matter whether the signs are observed or not. In both examples, the signs are also rooted in truth. The idea is easy to grasp for environmental signs, but it is no less applicable for human-produced information. A report qualifies as information when it is syntactically, semantically, and pragmatically correct. Even a false or mistaken sign carries information, though it is not the information that it appeared to hold. Regardless of the level of information that a sign brings, observers and receivers attempt to assign import to it.

The concept of import is used within the Mingers and Standing theory to highlight the biased aspect of information processing. The two define import as "the meaning for, or effect on, a receiver of a particular dataset or message."[xxviii] Information remains objective while subjectivity resides with the import placed on the received or observed sign. People, by their nature, are "meaning processors"[xxix] and are only able to assign import based on their prior knowledge and mindset at the time.

Previous knowledge also plays a role in the amount of information a receiver takes from a sign or message. A sign carries no information for an observer that does not know the language or does not understand how to use the proper tool. [xxx] After the assignment of meaning, action or inaction follows. According to Mingers and Standing, information systems exist to assist humans in this three-stage process.[xxxi] Much like Professor Arquilla, the theorists see technology as an instrument to use in a wider world of meaning processing.

Information and knowledge are intrinsically connected. Mingers and Standing go to great length to explain the ties between the two concepts. According to the authors, knowledge exists in four forms. Knowledge can be propositional (know that), performative (know-how), experiential (know of), or epistemic (know that and why).[xxxii] Viewed in this manner, their limits to what information becomes knowledge. Only propositional and epistemic knowledge emerge from information. The reason for this is because information is, by their definition, propositional as well. The complex interaction between knowledge and information also relates to data.

Data only exists as an intentional dissection of information that serves a practical purpose. The authors turn to the works of Ilkka Tuomi, a noted writer on the theories of knowledge management, to clear up this common source of confusion within the study of information. Tuomi, Mingers, and Standing all advocate for the reversed knowledge hierarchy.

Knowledge exists first, followed by available information, and finally, data. The traditional data-information-knowledge hierarchy can only follow afterward.[xxxiii] This assertion sets the concept of data in its rightful place. Tuomi's explanation helps to correct how information strategists use the terminology of their field.

Mingers and Standing provide fundamental relationships and definitions within their theory of information. These definitions and links are also flexible. Each applies to the various levels of information and provides a suitable template for planning. This theory focuses on knowledge first. Tuomi's reversed hierarchy springs from this point and completes a necessary foundation for the formulation of strategy. Corbett's idea of practical deliberation is attainable when common vernacular exists.

LIKE ENVIRONMENTS

Corbett's perspective on the maritime environment has important parallels to the information environment. These similarities make his approach to strategy in the maritime environment prescient and relevant to a plan for the employment of information today. Corbett describes the maritime domain in three important ways. It is common to all, naturally contested, and serves as a battleground for access. The information environment is no different.

The view of the maritime domain as a common area has critical strategic implications. Corbett asserted that the sea "is not susceptible of ownership, at least outside territorial waters."[xxxiv] A belligerent cannot own the oceans as if it were territory. Allies, adversaries, and neutrals generally share the same sea lanes. At sea, the offense and defense "tend to merge in a way that is unknown ashore."[xxxv] One cannot attack without also defending. There must also be a general sensitivity to the impacts of actions in the commons on third parties. Other domains are rarely under dispute in the same respect.

Since the seas are a common area, it also follows that they are always a contested space. Sir Corbett remarked that "the normal position is not a commanded sea, but an uncommanded sea."[xxxvi] Each belligerent conducts naval warfare to achieve command, thereby ensuring the perpetual dispute of the command of the sea. This notion is the raison d'etre of naval strategy. For Corbett, command of the sea was the entire purpose of naval warfare. His maritime strategy focuses on ways to reach this end while negotiating the sea's natural state of dispute.

The sea, much like the information environment, cannot be commanded. However, there are ways to control access to both. Corbett described this idea by saying that "the only right we or our enemy can have on the sea is the right of passage."[xxxvii] Access to sea lines of communication can be secured or denied. As Corbett applied his theory of naval warfare to its actual conduct, he concluded that achieving command requires "obtaining a decision" against the adversary's fleet or by a blockade.[xxxviii] U.S. adversaries may not have "fleets" per se in the information environment, but controlling access to lines of communication and points of distribution are no less critical.

The information environment shares similar traits and characteristics of the maritime environment. JP 3-13 *Information Operations* defines the information environment as "the aggregate of individuals, organizations, and systems that collect, process, disseminate, or act on information."[xxxix] This collective contains three interrelated dimensions referred to as the physical, informational, and cognitive dimensions. Individuals, organizations, and infrastructure comprise the physical aspect. The informational dimension encompasses where information flows and how it flows. Lastly, the cognitive element includes human information processing.[xl] Each of these dimensions helps to illustrate that the information environment is common and contested yet also accessible.

The information environment is undoubtedly a universal common space. The 2016 SOIE described it as a "heterogenous global environment where humans and automated systems observe, orient, decide, and act."[xli] It is neither military nor civilian, and it serves a multitude of purposes for different individuals and organizations. While aspects of the physical dimension are subject to ownership, the flow of information is not. This reality is an important point of caution for the development of an information strategy. Stopping information flow in the commons is fruitless. Time, effort, and resources are needed elsewhere.

The challenge of perpetual contestation exists in the information environment as well. Most U.S. government documents describe this problem as the loss of power over information. As Joseph Nye puts it, "Power over information is much more widely distributed today than even a few decades ago."[xlii] The cost of operating in the informational dimension has gone down. Nye and the 2018 JCOIE refer to this phenomenon as the diffusion of power. Non-government actors from corporations to individuals to terrorist groups generate, receive, and push content. Each seeks to protect its ability to send and receive signals and messages. They also compete for influence in the cognitive dimension. As in the maritime environment, the only way to gain control within these global commons is to look for ways to secure or deny access.

U.S. military doctrine focuses on influencing target audiences. Practitioners employ tools, known as information-related capabilities, to modify or preserve perceptions and attitudes. Effective use of these tools requires access to the cognitive domain. This viewpoint has become so prevalent that the JCOIE refers to perceptions and attitudes as "key terrain."[xliii] As Corbett explains, access is vital. Influence requires securing or denying the flow of content through the informational dimension. The acts of securing or denial may also require achieving effects in the physical dimension.

The maritime and information environments share important similarities. Each exists in a natural state of dispute. Though each is generally uncommanded, control is still possible. Corbett makes it clear that national or military means can dictate access to the maritime commons. As Corbett fuses theory and practice, he emerges with a maritime strategy predicated on this idea. The information environment is no different. A national information strategy viewed from this same lens is possible if it is rooted firmly in theory.

THE APPLICATION OF THE SEA CONTROL CONCEPT

Given the similarities in these two unique strategic realms, Corbett's tenets of sea control have applications in the information environment. His view of maritime strategy centered on the command of the sea or sea control, in contemporary terminology. The pursuit of this objective existed in two categories that amounted to a three-step approach to sea control. The strategy follows the pattern of disputing, securing, and finally, exercising control.[xliv] Corbett viewed this as the driver for everything from the composition of the fleet to naval policy. An understanding of these tenets is helpful to the formation of an information strategy.

Corbett recognized that the dispute of sea control was always possible. Even when a force lacks the relative strength to secure control for itself, there are still opportunities to deny it to others. He referred to this concept as "active defensive operations" that prevented the enemy from securing or exercising sea control.[xlv] In practical terms, Corbett saw the "fleet-in-being" concept and the use of minor counter-attacks as the means to accomplish dispute. This aspect of Corbettian strategy fused his theory of naval warfare with practical insight. The sea is naturally uncommanded, and no force is strong everywhere. Therefore, a naval force needs the means to dispute command continually in some areas, while securing or exercising command in other regions.

Securing command is possible in areas of relative advantage. Corbett defines securing as "putting it out of the enemy's power to use effectually the common communications or materially to interfere with our use of them."[xlvi] A decisive victory against the enemy's fleet was central to Corbett's view of the first portion of this definition. Blockade accomplished the second part. The offensive aspect, eliminating the enemy's use of the sea, is much more challenging than establishing the defense. Corbett instilled an important maxim here. Positions of relative strength present opportunities to secure control. Considerable time, effort, and assets find these chances. Exercising command is possible after that.

The exercise of sea control is the largest part of naval warfare. In Corbett's view, this served several purposes. He qualified all operations focused on using the sea lines of communication as part of a maritime strategy.[xlvii] They may logically follow actions to secure command, but they may also happen at the same time. Corbett illustrated this point quite clearly by marking the three main ways to exercise sea control. These methods are a defense against invasion, the control or attack of trade routes, and lastly, the support to military operations ashore.

This diversity in purpose illustrates the importance of the sea as a strategic environment. The exercise of command serves national purposes, not just naval ones. The information environment shares a similar dynamic. Each element of national power benefits from the ability to exercise control in the information environment. These unique global commons demand a strategy steeped in theory yet tempered by practicality.

A model for a national information strategy requires a focus on knowledge, intensive target audience analysis, and tailored operations. These foundations are critical to the application of a Corbettian-style operational approach. The information strategy first determines what

knowledge to impart to the target audience or audiences. It must then apply the resources to understand what prior knowledge the target audience possesses. Finally, tailored operations are possible in which access within the information environment is disputed, secured, and exercised. Through this sea control style method, the means of national instruments of power, as well as information-related capabilities, achieve the end state of influence.

Disputing access in the information environment is similar to the maritime environment. As Corbett states, the environment exists in its natural contested state unless a force possesses the relative strength to secure it. There are three aspects of the information dispute stage. The first is the generation of information. Mingers, Standing, and Tuomi posit that information only materializes from articulation and verbalization of knowledge.[xlviii] The second is the protection of said information. The last step is countering any misinformation directed at a target audience. These actions in tandem not only dispute access to a target audience, but they deny access to friendly information while setting the conditions to secure access to this or other audiences.

The concept of securing in the information environment refers to both gaining and maintaining access to a target audience. Access relies on the use of national power (economic ties, military cooperation) and "soft power." Joseph Nye explains "soft power" as a combination of a nation's culture, political values, and foreign policies.[xlix] These elements establish a path of communication to certain audiences. A considerable effort is needed merely to ensure the maintenance of this access. After access is secured, the opportunities to exercise it are made available.

Much like Corbett's sea control theory, exercising access comprises the largest part of the information strategy model. Strategists direct generated signals and messages to target audiences with access secured. These operations are tailored based on the audience's prior knowledge to

ensure that the sign creates a specific import in the receiver. Actions here may use public affairs, deception, or psychological operations tools. Regardless of the means, the focus of this stage is on using signals to bias the receiver's import, thereby influencing behavior, perceptions, and actions. Assessment of these influenced actions and attitudes is crucial. According to Tuomi, the traditional data-information-knowledge hierarchy begins here. With refined knowledge and understanding of the target audience, future operations sustain their effectiveness.

It is important to consider that the stages of the information strategy model are not necessarily sequential. In many cases, the stages occur in parallel, depending on the target audience and the message. Corbett offers the same reminder. His prescient viewpoint in a similar strategic environment illustrates a path to the development of an information strategy.

COUNTERARGUMENT

Some may argue that existing concepts and doctrine describe an acceptable information strategy for the United States. As one of the nation's most well-funded and resourced assets, the Department of Defense has a responsibility to be at the forefront. Solutions that are driven by the military source of national power serve two important purposes. Military solutions ensure that the nation focuses on defeating adversaries. The Department of Defense possesses the organizational capacity to synchronize a whole of government effort. These characteristics permit the goals of the 2016 SOIE to serve as national goals.

The SOIE describes an end state that applies beyond the military dimension. The document frames how the DoD can ultimately "affect the decision-making and behavior of adversaries and designated others to gain advantage."[li] This description is no different than the way Professor Nye describes how countries wield power. Nye states that power is "the ability to affect others to obtain the outcomes you want."[lii] Like any other nation, the United States has an

agenda in world politics. Enacting this plan requires the same objective of influence set by the DoD.

The ways and means outlined by the SOIE provide an organizational design that the rest of the government can follow. The nine ways that the strategy supports the end state of influence are a testament to what the DoD does very well. The expansion of resources, synchronization of efforts, partnership building, and advocacy for U.S. credibility[lii] are all key parts of how the nation can leverage information. Contemporary information environment thinkers concur that these are ingredients to building strategy. Dr. Robert Ehlers states that it is imperative that the United States "consider how to use an all-of-government and all-IOPs [information operations] approach, in coordination with our many allies and associates, to seize the initiative and gain a continuing advantage…"[liii] Though the Department of Defense's design establishes a much-needed infrastructure, many strategic questions are left unanswered.

REBUTTAL

The Defense Department's strategy to restructure for information environment operations is no substitute for a specific strategy to combat the U.S.'s adversaries. The Congressional Research Service recognized the same in its 2018 report on information warfare. The document asks Congress to consider "whether the United States has a strategy in place to match the robust IW strategies of its competitors, and whether the U.S. government has institutions, organization, and programs to wage and win an information war or to deter foreign information operations."[liv] The military may head the latter aspect but cannot solve the former.

The United States still lacks an actionable grand strategy for information. Dr. Ehlers points out that two questions need answering. The first is "What is the grand-strategic problem?" and the second is "What do we do about it?"[lv] Furthermore, as Corbett states, a strategy requires

a common understanding and vernacular born from theory. A grand strategy must be subject to deliberation and practical discussion but cannot afford to fall victim to widespread misinterpretation easily. Without this, the nation's ability to effectively leverage the information environment and respond to threats within it remains stifled.

CONCLUSION

A national information strategy is possible. The adoption of a supporting theory synthesizes existing Department of Defense efforts with an academic examination of how to reach national goals. Documents such as the Reagan administration's National Security Decision Directive 130, which states in no uncertain terms the "fundamental purpose of US international information programs"[lvi] are needed today. National policies synchronize the actions of government agencies and enable the use of soft power where necessary. The U.S. advantage is not lost, but a strategy is required to make up for some lost time.

RECOMMENDATION

Develop a Corbettian style national information strategy that adopts Mingers, Standing, and Tuomi's definitions and relationships. The figure below depicts the "sea control model."

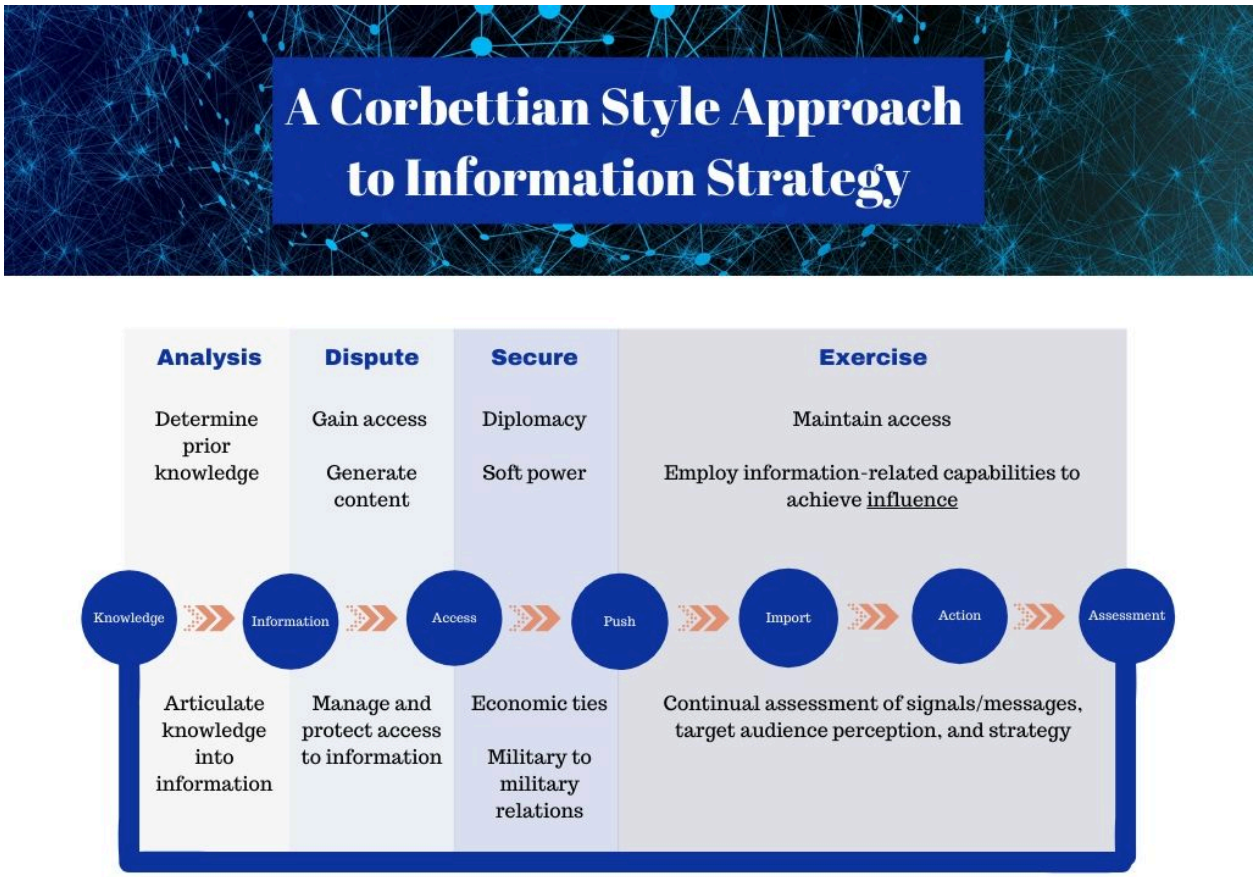

Figure 1 *Information Strategy model*

NOTES

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